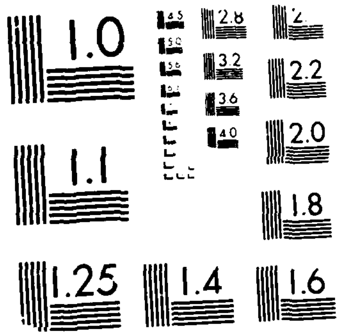
AD-A190 759 A USER'S DESIGN OF A DECISION SUPPORT SYSTEM FOR 1/2
NONCOMBATANT EVACUATION (U) AIR FORCE INST OF TECH
WRIGHT-PATTERSON AFB OH SCHOOL OF ENGI S R KOSTEK
UNCLASSIFIED MAR 88 AFIT/GST/ENS/88M-7 F/G 15/1 NL



MICROCOPY RESOLUTION TEST CHART

NATIONAL BUREAU [illegible] STANDARDS [illegible]

A USER'S DESIGN OF A
DECISION SUPPORT SYSTEM FOR
NONCOMBATANT EVACUATION OPERATIONS
FOR UNITED STATES CENTRAL COMMAND

THESIS

Stephen R. Kostek
Captain, US ARMY

AFIT/GST/ENS/88M-7

DEPARTMENT OF THE AIR FORCE
AIR UNIVERSITY
AIR FORCE INSTITUTE OF TECHNOLOGY

Wright-Patterson Air Force Base, Ohio

AFIT/GST/ENS/88M-7

A USER'S DESIGN OF A DECISION SUPPORT SYSTEM FOR NONCOMBATANT EVACUATION OPERATIONS FOR UNITED STATES CENTRAL COMMAND

THESIS

Stephen R. Kostek
Captain, US ARMY

AFIT/GST/ENS/88M-7

AFIT/GST/ENS/88M-7

A USER'S DESIGN OF A DECISION SUPPORT SYSTEM FOR NONCOMBATANT EVACUATION OPERATIONS FOR UNITED STATES CENTRAL COMMAND

THESIS

Presented to the Faculty of the School of Engineering

of the Air Force Institute of Technology

Air University

In Partial Fulfillment of the

Requirements for the Degree of

Master of Science in Operations Research

Stephen R. Kostek, B.S.

Captain, US ARMY

March 1988

Approved for public release; distribution unlimited

Preface

The purpose of this research effort is to develop a conceptual design of a Decision Support System (DSS) which will support United States Central Command (USCENTCOM) in determining the appropriate military force size and type in support of Noncombatant Evacuation Operations (NEO). This design will serve as a statement of USCENTCOM NEO planners' requirements for a total DSS to be developed. The methodology used in this research, the adaptive design process, is especially suited to deal with subjective, unstructured problems such as the decision process involved in force structure determination.

In performing this research and writing this thesis I have had a great deal of help and encouragement from several people. I am deeply indebted to my thesis advisor, Lt Col John R. Valusek, for his patience, understanding, and perseverance. I would like to express my appreciation to JCS-J8 for the financial support which allowed this to happen. I also wish to thank CDR Freeman, LTC Milano, and MAJ Combs at USCENTCOM for their assistance and cooperation during the early stages of the thesis effort. A word of thanks is also owed to MAJ Chuck Fletcher for his untiring patience in tutoring me on the Apple II. Finally, I wish to thank my fiance Mary Jane for her encouragement and patience during these past few months.

Stephen R. Kostek

Table of Contents

List of Figures

Abstract

Perhaps the most sensitive and most likely to occur crisis operation within any of the geographically oriented unified commands is the conduct of Noncombatant Evacuation Operations (NEO). NEO is a system which has been developed in order to evacuate all U.S. civilians and military dependents from a given area in the event of an emergency situation which poses a threat to their safety. The purpose of this research effort is to develop a conceptual design of a Decision Support System (DSS) which will support one of the unified commands, United States Central Command (USCENTCOM), in determining the appropriate military force size and type to be used to support the NEO. The major problem with determining the command and control planning requirements is that the command and control required for the conduct of a NEO presents a very unstructured problem area. The most significant factors which impact and cause NEO to be an unstructured problem are the time constraints involved and the need for intuitive (i.e. subjective) input versus objective input in the military force size determination. This paper expands on the methodology used to capture the subjective judgements and planning factors taken into consideration by the USCENTCOM NEO planners and at the same time provide the

DSS builder an objective framework on which to build a supporting system. This methodology, often referred to as rapid prototyping or the adaptive design process, has been used to develop the concept DSS. Requiring a high level of user participation and involvement, the experimental adaptive design approach used in this research combines such techniques as concept mapping, storyboarding, and feature charts to determine DSS requirements and capture the decision process used by the NEO planners. Using these techniques, a problem space is defined and bounded. From this problem space, a key subproblem or "kernel" is identified which forms the basis of the DSS. This thesis discusses these techniques and illustrates how they were incorporated and expanded upon in the conceptual development of the specific NEO Decision Support System.

A USER'S DESIGN OF A DECISION SUPPORT SYSTEM FOR NONCOMBATANT EVACUATION OPERATIONS FOR UNITED STATES CENTRAL COMMAND

I BACKGROUND

Background

United States Central Command (USCENTCOM). USCENTCOM is located at MacDill Air Force Base in Tampa, Florida, and is a unified command subordinate to the Joint Chiefs of Staff (JCS). Originally designated as the Rapid Deployment Joint Task Force (RDJTF) in 1979, USCENTCOM is a geographically oriented unified command responsible for the Southwest Asia theater of operations. USCENTCOM has the responsibility to observe and monitor events in its area of responsibility and to plan and conduct military operations on order from JCS.

Perhaps the most sensitive and most likely to occur crisis operation within USCENTCOM's Area of Responsibility (AOR) is the conduct of Noncombatant Evacuation Operations (NEO). NEO is a system which has been developed in order to evacuate all U.S. civilians and military dependents from a given area in the event of an emergency situation which poses a threat to their safety. Such an emergency situation requiring military intervention may develop with very little warning.

Because of its political sensitivity, evacuation from any given country is usually taken as a last resort. Also,

the decision to evacuate is a judgement call made by the U.S. ambassador in that country and approved by the U.S. State Department (Freeman, 1987). This decision is usually made when the situation has deteriorated to the point where continued presence in the host country is dangerous to U.S. citizens, but the host country can still guarantee some degree of protection and ensure a safe evacuation. However, there is a very fine line which can be crossed when the situation deteriorates faster than the decision can be made to evacuate with host country assistance. When the host country can no longer guarantee the safety of U.S. citizens and dependents, the ambassador identifies the need for U.S. military intervention through the State Department to provide the necessary security to ensure a safe evacuation of all U.S. noncombatants. Obviously, the planned introduction of U.S. combat forces in a foreign country is a very significant and politically sensitive issue (Freeman, 1987).

Throughout the potentially brief decision process outlined above, USCENTCOM personnel would have been monitoring the situation and performing their own crisis assessment. Additionally, USCENTCOM planners would have been developing alternative courses of action to support NEO in the event of a request for U.S. military intervention and a subsequent JCS warning order. The most significant problem which faces USCENTCOM planners in the

development of courses of action is the limited amount of time available. By its very nature, planning in a crisis situation is very time-sensitive and may be subject to error because of (1) reduced access to deployment data (operations security implications) and (2) not having the time to develop or consider all possible options. Additionally, many of the staff officers assigned to the joint commands have little or no experience in the joint contingency planning arena. These problem areas have the potential to produce plans which do not reflect the true military situation and consequently result in failure. Although USCENTCOM planners will have been assessing the situation and developing NEO courses of action before the JCS warning order is received, the largest problem continues to be the limited amount of time available. Based on past experience, "USCENTCOM planners ideally need one to two weeks to develop and evaluate NEO courses of action" (Freeman, 1987). This is not acceptable, especially if the situation in a host country deteriorates more rapidly than estimated and the JCS warning order requires USCENTCOM to take military action within 24 to 48 hours.

Besides the limited amount of time available, another significant problem facing USCENTCOM NEO planners is the determination of the size and type of the military force needed to provide and ensure the security of all U.S.

noncombatants in the evacuation process. Presently, the determination of the size and type of the military force needed is the result of a multitude of factors and remains a largely unstructured decision process. Some of the factors which have an impact are:

1) the host country environment (i.e. semipermissive, nonpermissive/hostile);
2) threat disposition and composition;
3) number of U.S. noncombatants; and
4) location and distances between locations of noncombatants.

Presently, all of these factors form the basis of determining the military force size and type, but the final determination is still a very subjective call on the part of the decision maker. The decision maker in a Southwest Asia NEO scenario is the Commander-In-Chief, USCENTCOM (CINCCENT). Due to the distances involved between the United States and USCENTCOM's AOR, the ability to project military power is significantly degraded. Forces are not readily available in the AOR and consequently must be transported by air and sustained over an 8,000-mile leg. Additionally, because of the reduced amount of planning time available in a crisis situation requiring NEO and the factors outlined above, many constraints impact the force type and size determination process. Essentially, the combination of these factors results in a very succinct

"economy of force" measure where the decision maker (i.e. CINCCENT) must determine the minimum size force needed to perform the mission of providing the necessary security to ensure the safe evacuation of all U.S. noncombatants.

There are 17 countries in USCENTCOM's AOR. Most of the countries have coastlines; and consequently, evacuation can be conducted using the ships of U.S. Naval Forces in the area thereby reducing airlift requirements, assuming time is available. However, the most difficult NEO situation exists in a host country where the U.S. noncombatants are isolated from the sea; and therefore, both insertion of military forces and evacuation of noncombatants is required by air. The airlift factor critically impacts on the size of the plausible military force. The airlift acts as a constraint to limit the needed forces.

Once the size and type of the military force has been determined, various courses of action are developed to support the NEO. An important step which must be performed after courses of action are developed is an analysis of those courses of action. This analysis is done with respect to each course of action so that the course of action which offers the highest probability of success can be determined. In this situation, success is defined as the safe evacuation of all U.S. noncombatants using the smallest possible force. Because of the crisis situation

and the limited amount of time available, a detailed course of action assessment is often not conducted. Consequently, the NEO could result in failure.

USCENTCOM NEO planners are aware of the problem areas and the constraining factors, and are seeking methods to improve the development and assessment of courses of action while reducing the time required to do so. However, in spite of the fact that NEO is a very sensitive issue and one of the most likely USCENTCOM missions given its AOR, it remains a lower priority area when compared with the deliberate planning efforts required for USCENTCOM's other missions.

Research Problem

The time constraint which impacts on the available planning time to develop NEO courses of action is a problem area at USCENTCOM because of the peculiar requirements of a NEO environment and the number of factors involved in determining the appropriate military force size and type. It may be beneficial to investigate computer aids for the decision process of determining the military force needed to ensure the safe evacuation of U.S. noncombatants.

Research Objectives

1) The purpose of this research effort is to develop a conceptual design of a Decision Support System (DSS)

which will support USCENTCOM in determining the appropriate military force size and type. This design will serve as a statement of USCENTCOM NEO planner's requirements for a total DSS to be developed.

2) A second objective is to investigate adaptive design as a process to be used to support USCENTCOM NEO planners in the design of the DSS.

Scope and Limitations

The process of determining the appropriate military force size and type as part of a total DSS will be scoped to one country (i.e. Sudan) within USCENTCOM's area of responsibility. The decision process for military force size determination should remain relatively unchanged from one country to another.

The scope of this research will be to develop a conceptual design of a DSS to be used by USCENTCOM in defining their requirements for a NEO DSS.

The remainder of this thesis is divided as follows. Chapter Two presents a limited literature review of the methodology used in this research effort. Chapter Three addresses how the methodology was used in the application of the adaptive design approach to a specific NEO Decision Support System. It also serves as a statement of requirements for USCENTCOM. Chapter Four provides the

conclusions and recommendations for resolving the research problem, the value of the adaptive design approach, and the direction for further research and future implementation.

II METHODOLOGY

Introduction

As described in Chapter One, the purpose of this research effort is to determine USCENTCOM command and control planning requirements for conducting Noncombatant Evacuation Operations (NEO). More specifically, the objective is to develop a conceptual design of a Decision Support System (DSS) which will support USCENTCOM in determining the appropriate military force size and type to be used to support NEO. The major problem with determining the command and control planning requirements is that the command and control required for the conduct of a NEO presents a very unstructured problem area. The most significant factors which result in NEO being an unstructured problem are the time constraints and the need for intuitive (i.e. subjective) input versus objective in the military force size determination. What is required is a methodology which can capture the subjective judgements of the USCENTCOM NEO planners and at the same time provide the DSS designer/builder a framework on which to build a supporting system.

This chapter begins by discussing the present crisis action system and some general inadequacies. Chapter Two then discusses decision support systems in general, the adaptive design methodology and the three experimental

techniques used to support this methodology: concept mapping, storyboarding, and feature charting.

Crisis Action System

After a series of crises in the early 1970's, the National Command Authority (NCA) became concerned that the military organization for responding to crisis situations was ineffective and that the reporting structure was not providing adequate and timely information to support the decision making process. Consequently, a system for time-sensitive planning was developed called the Crisis Action System (CAS) (AFSC Pub 1, 1986: 7-4).

Due to the time constraints, political sensitivity, as well as the immediate danger to the lives of U.S. noncombatants, NEO is considered as a response to some crisis and falls under the auspices of the Crisis Action System.

The Crisis Action System is composed of six distinct phases. In really time-sensitive crises, these phases may be combined or eliminated. These six phases are:

1) Situation development,
2) Crisis assessment,
3) Course of action development,
4) Course of action selection,
5) Execution planning, and
6) Execution (AFSC Pub 1, 1986: 7-5).

For the purpose of this research effort and the objective of this thesis, only the course of action (COA) development phase will be discussed.

In the COA development phase, USCINCCENT develops and recommends one or more COAs to the Joint Chiefs of Staff (JCS) in a commander's estimate. The development of these COAs which include force selection, alerting, and preparation is usually in response to a JCS WARNING ORDER (AFSC Pub 1, 1986: 7-10). In a NEO situation, USCENTCOM planners have access to existing contingency plans which must be expanded upon in order to execute the NEO. The most critical element facing the planners is time.

Presently, when a crisis situation erupts at USCENTCOM an ad hoc planning group is created in response to that specific crisis (Freeman, 1987). Usually the members of this group have the brightest minds, but unfortunately have not worked with each other on a continual basis and consequently strengths and weaknesses of individual players are unknown. This is not a unique situation; most commands follow this procedure in creating ad hoc groups to address crisis situations. This may not be the best use of personnel resources.

However, even using the present CAS in place, the development of COAs by the planning group is essentially a "stubby pencil" drill. This may not be a good approach given the availability of computer resources and large data

bases. The "stubby pencil" drill needs automation support to make maximum use of the resources and limited time available. Therefore, a system that is flexible, adaptable and that supports the force size determination process seems to be more appropriate.

Decision Support Systems

An approach or methodology to developing a NEO force size decision aid is the adaptive design or rapid prototyping process used in building decision support systems. The field of decision support systems (DSS) is still young and appears to be growing with time and a wider range of acceptance. Consequently, there is not one standard definition for a DSS. Valusek defines a DSS as "a system, manual or automated, that aids a decision maker in the cognitive processes of judgement and choice" (Valusek, 1987). According to Keen and Scott-Morton, "a DSS implies the use of computer hardware and software to:

1) Assist managers in their decision process in semi-structured tasks.
2) Support, rather than replace, managerial judgement.
3) Improve the effectiveness of decisionmaking rather than its efficiency" (Keen and Scott -Morton, 1978: 1).

Watson and Hill define a DSS as "an interactive system

that provides the user with easy access to decision models and data in order to support semistructured and unstructured decision-making tasks" (Watson and Hill, 1983: 82). Alavi and Napier define a DSS as "computer based systems designed to enhance the effectiveness of decision makers in performing semi-structured tasks. With such tasks, the decision maker is uncertain about the nature of the problem/opportunity, the alternative solutions, and/or the criteria or value for making a choice. Hence, the primary role of a DSS is to aid the judgement processes as the decision maker contends with poorly defined problems" (Alavi and Napier, 1984: 21). Hagwood restricts his definition of the term DSS to "computer based systems for supporting non-repetitive unstructured or semistructured organizational decisions" (Hagwood, 1986: 3). Sprague and Carlson prefer to define a DSS in terms of the characteristics which DSSs should possess:

> "1) Decision focused, aimed at top managers and executive decision makers.
>
> 2) Emphasis on flexibility, adaptability and quick response.
>
> 3) User initiated and controlled.
>
> 4) Support for the personal decision-making styles of individual managers" (Sprague and Carlson, 1982: 7).

Some other observed DSS characteristics, according to

Sprague, which have evolved from the work of Alter, Keen, and others include:

> "1) They tend to be aimed at the less well structured, underspecified problems that upper-level managers typically face.
>
> 2) They attempt to combine the use of models or analytic techniques with traditional data access and retrieval functions.
>
> 3) They specifically focus on features that make them easy to use by noncomputer people in an interactive mode.
>
> 4) They emphasize flexibility and adaptability to accomodate changes in the environment and decision-making approach of the user"
>
> (Sprague and Carlson, 1982: 6).

The terms unstructured and semistructured problems are terms which are mentioned in several of the DSS definitions discussed previously, but what do they mean. Burleson defines unstructured problems as those problems which have time constraints, a need for intuitive inputs, require a large search time, or there is some uncertainty about some of the decision parameters (Burleson and others, 1986: 57). Meador and Rosenfeld define a semistructured decision-making environment as one that is not well enough understood to permit a complete analytical description (Meador and Rosenfeld, 1986: 160).

Adaptive Design

In order to develop an effective DSS, a different, more flexible approach must be used versus the traditional approach to system development. Alavi and Napier state that "the very nature of a DSS requires a design method different from the traditional life cycle approach for the development of transaction processing systems" (Alavi and Napier, 1984: 21). One of the reasons for a different and more flexible approach may be because of the psychological limitations of the user. Users are often not able to define the problem space or state their requirements. They may have an idea of what they need but are simply unable to verbalize it. However, when the user sees something definitive on paper, it is much easier for him to request changes because he is working from some established format. Essentially, the user is stating that "I don't know what I want, but I'll know when I see it" (Valusek, 1987). Sprague and Carlson explain their reasons why DSS requires a different design technique from the traditional approach by stating, "Because there is no comprehensive theory of decision making, and because of the rapidity of change in the conditions that decision makers face, the traditional approaches for analysis and design have proven inadequate. Designers literally cannot get to first base because no one, least of all the decision maker or user, can define in

advance what the functional requirements of the system should be" (Sprague and Carlson, 1982: 15). In order to have a better grasp of the differences between adaptive design and the traditional design process addressed above, it may be useful to provide a short explanation of the traditional approach.

The traditional systems development approach takes the form of five distinct steps. These steps are:

"1) Determine the system requirements;

2) Design the system;

3) Develop the system;

4) Implement the system; and

5) Evaluate the system" (Valusek, 1987).

A problem area with this approach is that the DSS builder/designer must "freeze" the requirements at some point in order to start the development process. Consequently, once requirements are stated, any change in requirements will not affect the design process. This freezing of the requirements snowballs throughout the entire traditional approach in the system design, development, and implementation steps. Only after the evaluation has been conducted can new requirements be accepted and then the whole process is started over again. One iteration of this approach can and usually does take up to several years (Valusek, 1987). User generated requirements cannot be incorporated rapidly into the

traditional system development process. Consequently, the system is very inflexible and wastes both time and money. Another problem with the traditional approach is that there is limited contact between the user and designer/builder until the evaluation step. This step is just too late in the cycle to accommodate any rapidly changing situations which may impact on the user during the ongoing DSS design step. If the DSS is going to work, it needs to be user oriented. Rouse and Rouse state that "another potential explanation for decision aids not being accepted is that user participation in design has not been given the necessary primacy" (Rouse and Rouse, 1983: 1).

The adaptive design approach follows the same format as the traditional design approach except it reduces the time required to complete one iteration of the development cycle from what may be several years to several weeks. Sprague and Carlson state that:

> DSS need to be built with short, rapid feedback from users to ensure that development is proceeding correctly. They must be developed to permit change quickly and easily. The result is that the most important four steps in the typical systems development process (analysis, design, construction, implementation) are combined into a single step which is iteratively repeated. The essence of this approach is that the manager and builder agree on a small but significant subproblem, then design and develop an initial system to support the decision making that it requires (Sprague and Carlson, 1982: 15).

Strong support for the adaptive design approach is expressed by Keen when he states the following reasons:

"1) The designer or user cannot provide

functional specifications or is unwilling to do so.

2) Users do not know what they want and the designers do not understand what they need or can accept.

3) Users' concepts of the task or decision situation will be shaped by the DSS.

4) Intended users of the system have sufficient autonomy to handle the task in a variety of ways" (Keen, 1980: 15).

After illustrating the need for the adaptive design process in building a DSS, the process needs to be addressed itself. There are five principal steps in adaptive design. These steps are:

1) Select the right problem;
2) Identify key decisions or kernels in the problem;
3) Perform a requirements analysis of the kernel;
4) Iterate until an acceptable design is made;
5) Implement the system (Valusek, 1987).

It must be kept in mind that along with these steps the user and builder are always meeting with each other and constantly evaluating the system's development to date.

In an experiment in applying the adaptive design approach to DSS development, Alavi and Napier offered some

important conclusions. These were:

"1) The adaptive design approach requires a high level of user participation and involvement.

2) Rapid progress in defining the user requirements and developing DSS capabilities during the early stages of the development process establishes the credibility of the DSS builder and leads to user cooperation.

3) A DSS generator is a critical factor in the application of the approach.

4) The adaptive design approach seems to reduce the requirement for formal user training.

5) The perceived value of the DSS during the early stages of the adaptive design process seems to be the necessary incentive for its adoption by the user" (Alavi and Napier, 1984: 21).

<u>Techniques</u>

In order to determine what the problem space really is, and to identify the important subproblem which will serve as the nucleus of the evolving system as well as portraying the decision process, various techniques are being experimented with. These techniques include concept mapping, storyboarding and feature charting. Each of these techniques will be covered in the remainder of this

chapter.

Concept Mapping

A concept map provides a quick and general bounding of the problem space. In its most simple case, a concept map "is two or more concepts that are linked to each other depicting a meaningful relationship" (McFarren, 1987: 45).

D. Bob Gowin developed the use of concept maps as teaching tools while at Cornell University. He explains that "concept maps are intended to represent meaningful relationships between concepts in the form of propositions. Propositions are two or more concept labels linked by words in a semantic unit" (Gowin, 1984: 15). A simple example of a concept map is illustrated in Figure 1 below.

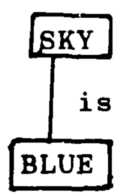


Figure 1. Simple Concept Map

The example given above illustrates the linkage of the two propositions in boxes linked by a word.

McFarren expanded upon the use of concept mapping in an effort to determine the problem space and consequently

the identification of information requirements. McFarren states that "Concept mapping is designed to meet the requirements for capturing the problem space. By identifying the key factors and ideas of a problem space and representing their relationships to each other, the problem will be identified and described by a map of the concepts" (McFarren, 1987: 40). An example of a more detailed concept map is illustrated in Figure 2 on the following page.

One of the most important steps in the DSS process is the concept mapping interview conducted between the user and the DSS designer/builder. "The interview is a face-to-face meeting with the user. Its goal is to capture the user's understanding of the problem and his/her key decision elements. The interview is the most significant part of the entire DSS design process because the information and perceptions gained by the designer will be reflected in the final product" (McFarren, 1987: 74). Concept mapping allows the user/decisionmaker to better understand the problem through the identification of key points or kernels and in the bounding of the problem. McFarren states that "the kernel is a key decision element within the decision process. It provides a starting point for design of the DSS" (McFarren, 1987: 42).

Once a concept map of the problem space has been drawn, the next step is to construct the storyboards which

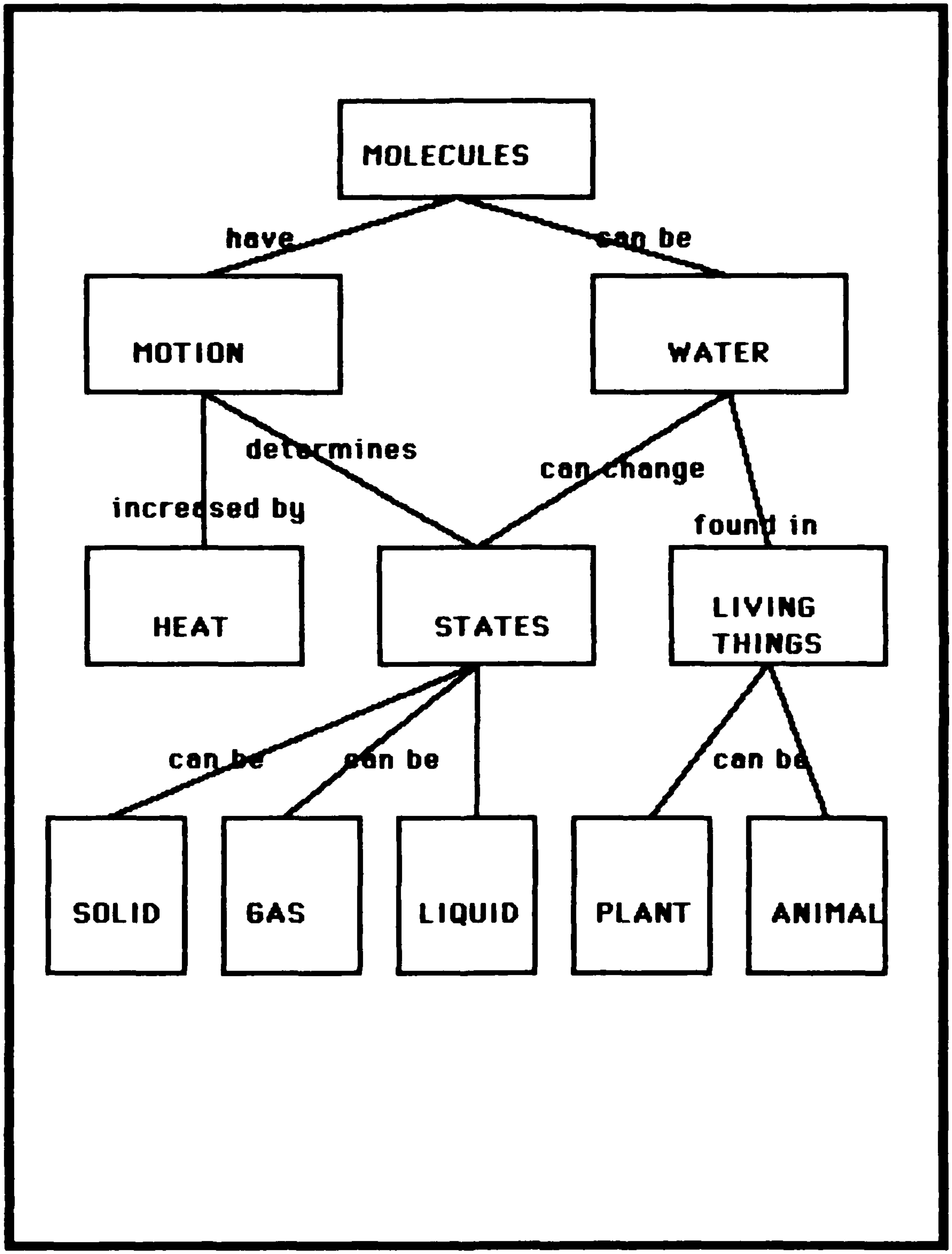


Figure 2 - Concept Map
(Taken from Gowin, 1984: 18)

model the decision process which is bounded by the concept map.

Storyboarding

Storyboarding, as labeled by Andriole, is a technique where the decision process is portrayed via screen displays during the requirements analysis process. As defined by Andriole, "A storyboard is a sequence of displays that represents the functions that the system may perform when finally implemented. When well done, it communicates to intended users system functions that could only be described piecemeal in static paper displays or words" (Andriole and others, 1987: 3). In this case, the concept map discussed previously forms the basis of the requirements analysis.

A technique that should be used when developing storyboards is the ROMC approach discussed by Sprague and Carlson. The acronym ROMC is based on four separate functions: Representations, Operations, Memory Aids, and Control Mechanisms. "The capabilities of the DSS from the user's point of view derive from its ability to provide **representations** to help conceptualize and communicate the problem or decision situation, **operations** to analyze and manipulate those representations, **memory aids** to assist the user in linking the representations and operations, and **control mechanisms** to handle and use the entire system"

(Sprague and Carlson, 1982: 96). Each storyboard needs to satisfy each of these aspects. Figure 3 provides an example of what one screen display of a storyboard may look like.

Once the design of the storyboard is acceptable to the user, the last step is to show the connectivity or sequencing of the individual screen displays of the storyboard.

Feature Charting

Feature charting was proposed by Seagle and Belardo as a graphic tool for analysis and communication. It was proposed because although the ROMC approach helped classify the components of the decision support system, it did not provide the analyst with the means of conveying the connectivity of representations to the user (Seagle and Belardo, 1986: 11). They believed that "the user and the designer need to know not only the specific controls, operations, and representations available, but also the various paths by which they can be reached" (Seagle and Belardo, 1986: 13). Essentially, the feature chart is a flow chart depicting the interconnectivity of the storyboard discussed earlier. Figure 4 on the page 26 provides an example of a feature chart. In relating the storyboard to the feature chart, the feature chart serves as an outline of the entire decision process in the DSS and

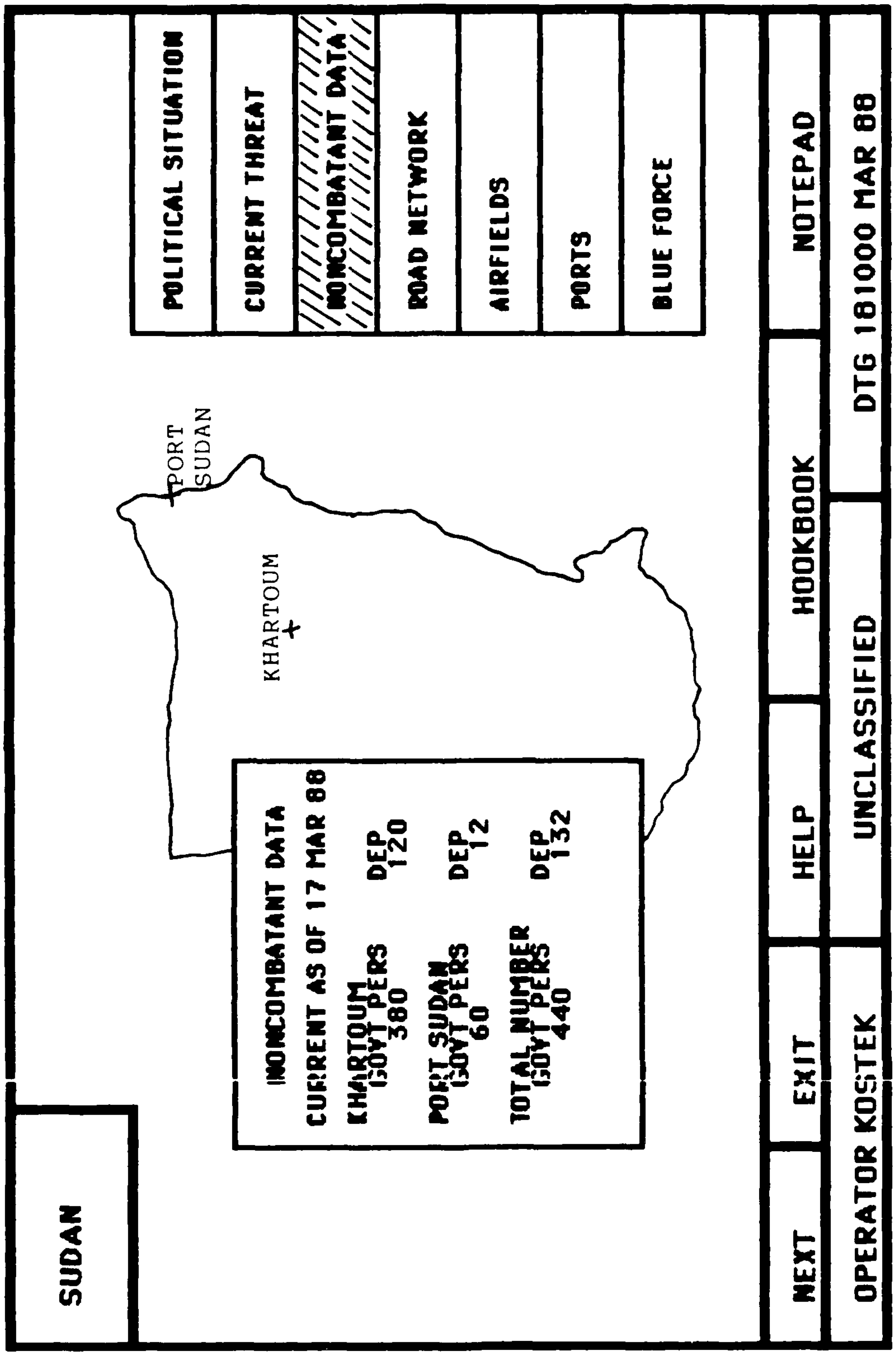


Figure 3 - Storyboard Screen Display

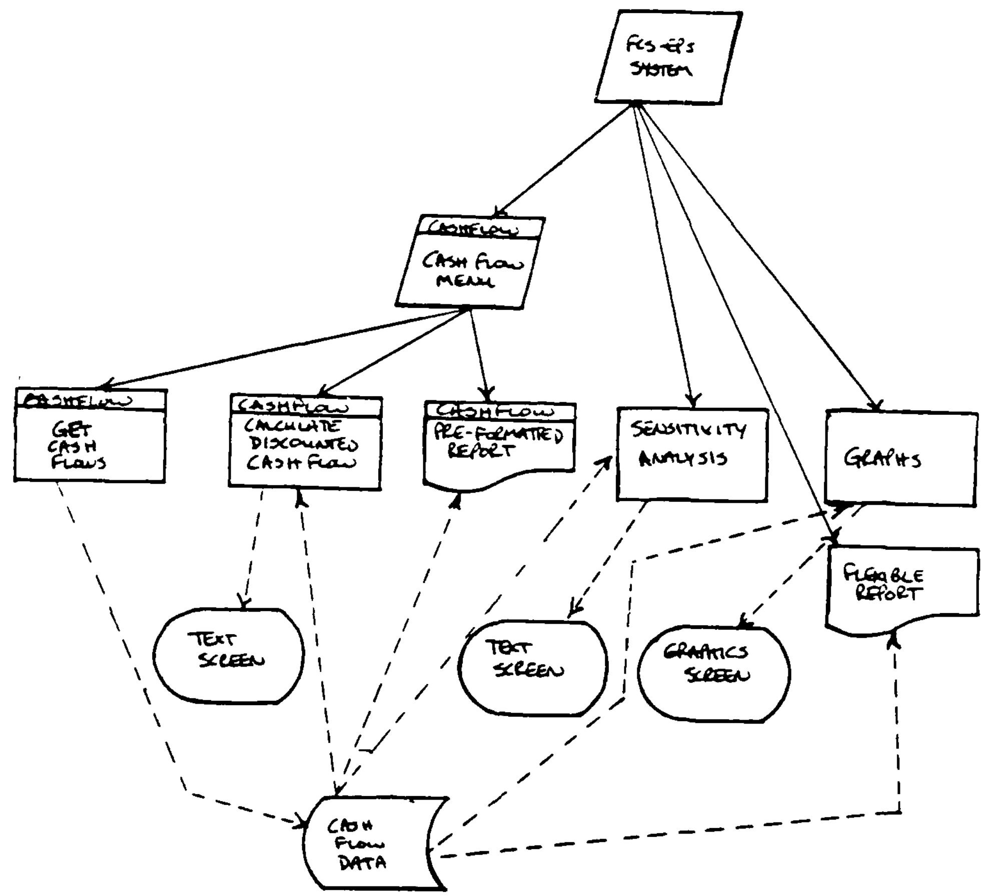


Figure 4 - Feature Chart
(Taken from Seagle and Belardo, 1986: 18)

the storyboard frame is one component within that feature chart.

The techniques of concept mapping, storyboarding, and feature charting are all analytical techniques designed to support the adaptive design process. These innovative tools provide a logical, flexible approach to frontend analysis. The very use of these tools orients the design of the decision support system on the user which is critical to the adaptive design process.

Chapter Three addresses how this methodology was used in the application of the adaptive design approach to a specific NEO Decision Support System.

III APPLICATION OF METHODOLOGY

Introduction

The methodology described in Chapter Two was used to define the problem space and determine the command and control requirements necessary to plan a successful Noncombatant Evacuation Operation (NEO). The following narrative provides an explanation of how these techniques were used to narrow the problem space and consequently satisfy the objectives of this research effort.

Initial Attempt

First Concept Map and Storyboard

The first step taken in this research effort was to conduct a concept mapping interview with CDR Dale Freeman, an experienced naval officer working as the J5 NEO Plans Officer for USCENTCOM. The initial question that was asked of CDR Freeman was "What type of information is required by the planners at USCENTCOM to plan for a Noncombatant Evacuation Operation?". The concept map at Figure 5, on the following page, provides a representation of CDR Freeman's response to that question.

Once the concept map was completed, the next step in the process was to start developing a storyboard, composed of various prospective screen displays, which portray the ideas depicted in the initial concept map. Figure 6 shows

NONCOMBATANT EVACUATION OPERATIONS CONCEPT MAP

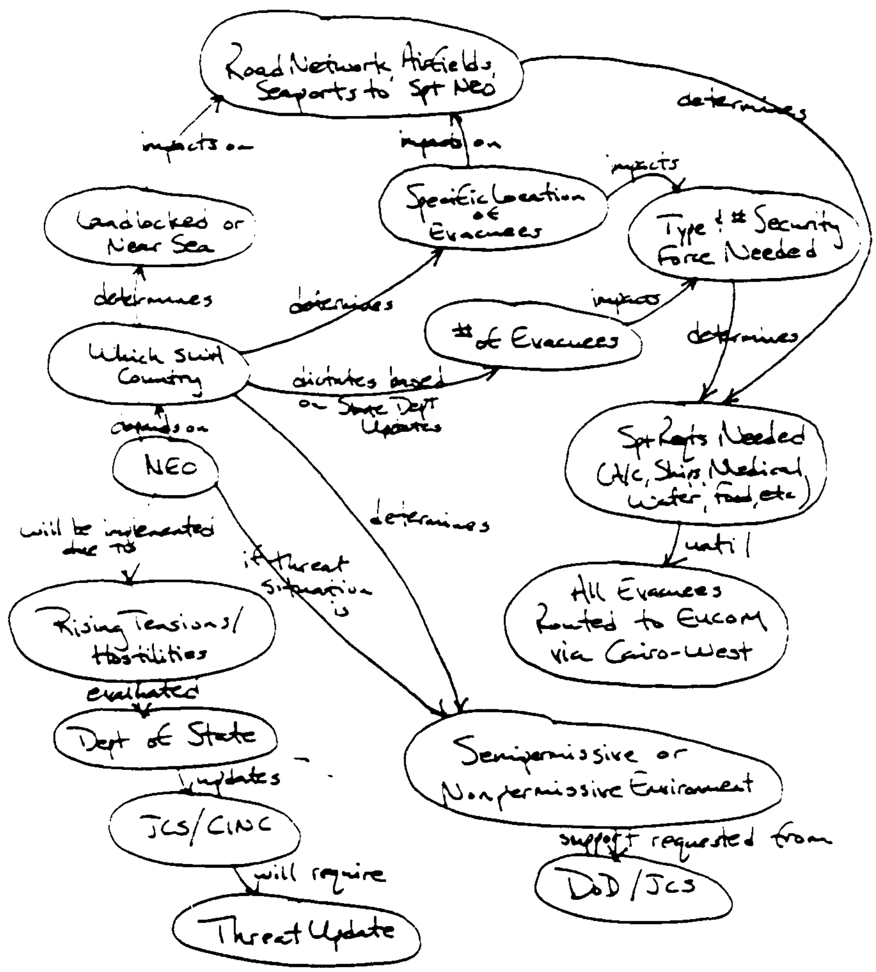


Figure 5 - Initial Concept Map

the initial design of a screen display within the storyboard called "Evacuee Data". For the sake of simplicity, the storyboard and subsequent screen displays would be built around one specific country within USCENTCOM's area of responsibility. For this research effort, the country of Sudan was chosen as a representative example.

Selecting a Kernel

After the first storyboard was developed, it was necessary to identify one specific idea from the concept map which would become the focal point, or kernel, upon which to expand. The reasons for doing this were to: 1) use the adaptive design approach in starting small and producing something for the user, 2) narrow the scope of the research effort, and 3) identify a critical planning factor faced by NEO planners at USCENTCOM. After careful examination of the concept map, it appeared that most of the ideas depicted were information factors which contributed to or impacted on one central planning factor. This factor, or kernel, was the determination of the size and type of military force needed to conduct the NEO. The other information factors were basically statements of fact, whereas the kernel required some subjective or intuitive input common to most complex decision making processes. Thus, the "force size determination" kernel was

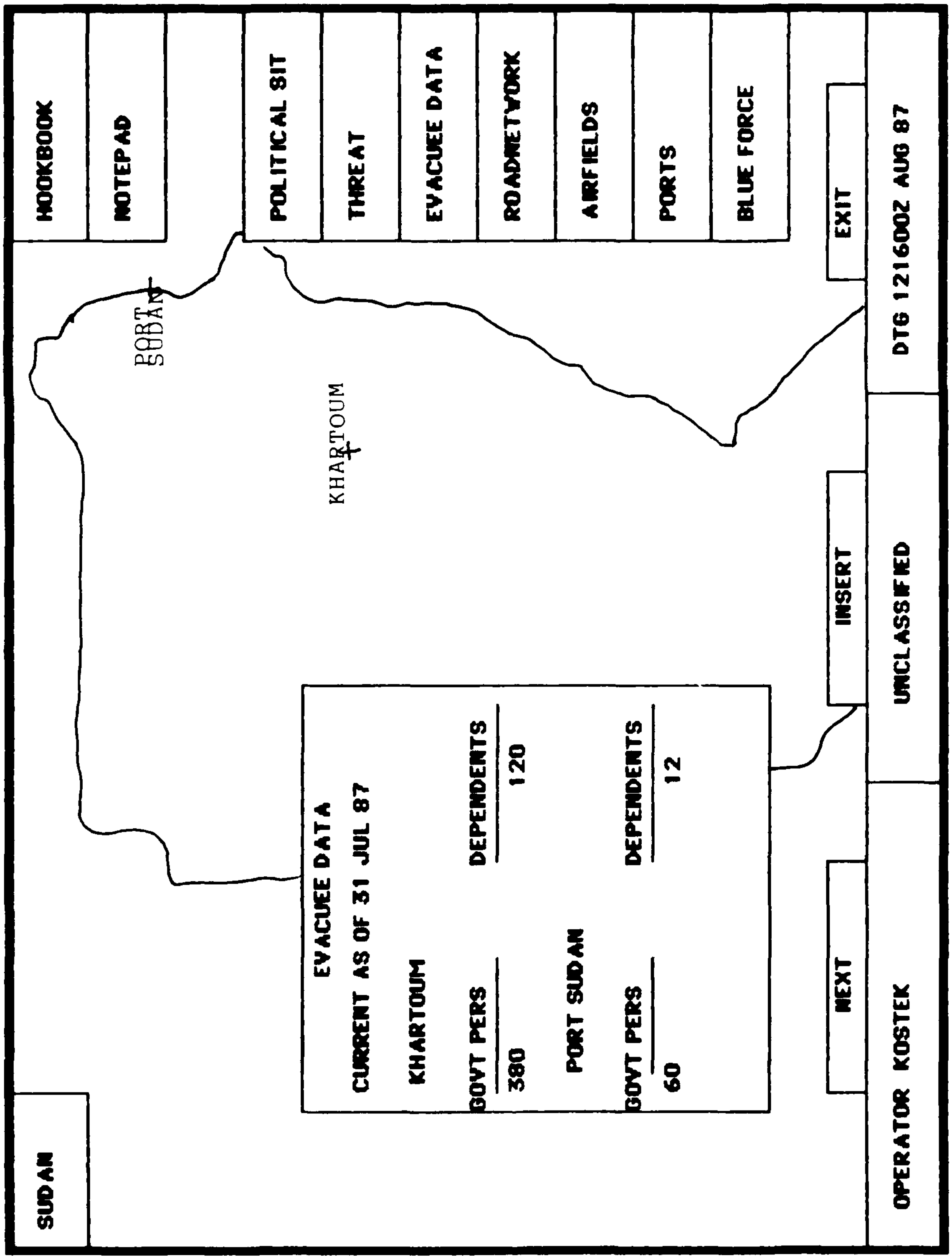


Figure 6 - Initial Screen Display

determined to be the most important aspect of the NEO planning process and consequently the area to begin design of the kernel system.

Factors Impacting on the Kernel

Based on the first interview and resulting concept map, it appeared that those factors which impacted on the force size and determination process were a function of the specific Southwest Asian country, the specific location of the noncombatants, and the numbers of noncombatants to be evacuated. In addition to these factors, time was also identified as a critical constraint on the NEO planning process. Keeping these factors in mind, the goal of this research effort was to design a Decision Support System which would have access to the necessary data in order to determine the NEO military force size and type needed to insure the safe evacuation of the U.S. noncombatants. The objective in the storyboard than changed from merely portraying ideas from the concept map to a sequential function which portrayed the thought process involved in determining the necessary force structure in the given time constraints.

Second Attempt:Refining the Storyboard

The previous storyboard and resulting screen displays were a "first cut" at determining and consequently

displaying those factors which influenced the force size determination process. The question which had to be answered was "How can the screen displays be integrated and combined in order to build the force required to conduct the NEO?". These "first cut" screen displays which provided information pertaining to the threat, noncombatant data, road networks, airfield and port data became the data base which was needed to build the security force required for the NEO. In other words, this particular data base constituted the "intelligence preparation" base needed before the force could be built.

Albeit very subjective, the "Blue Force" window within each screen display attempted to mirror the thought process of a NEO planner in building a security force by accessing the necessary data from the "intelligence preparation" portions of the storyboard. Figure 7 depicts a screen display pertaining to building a portion of the security force. In this case, the portion of the force needed to insure route security from each noncombatant location to the evacuation airfield. This screen display also illustrates the use of accessing the "intelligence preparation" data base (i.e. specific route threat and city roadnetwork data) in order for the planner to determine which size and type force would be needed along each route. It should also be noted that the screen display design shifted from a basic display to a pulldown menu display

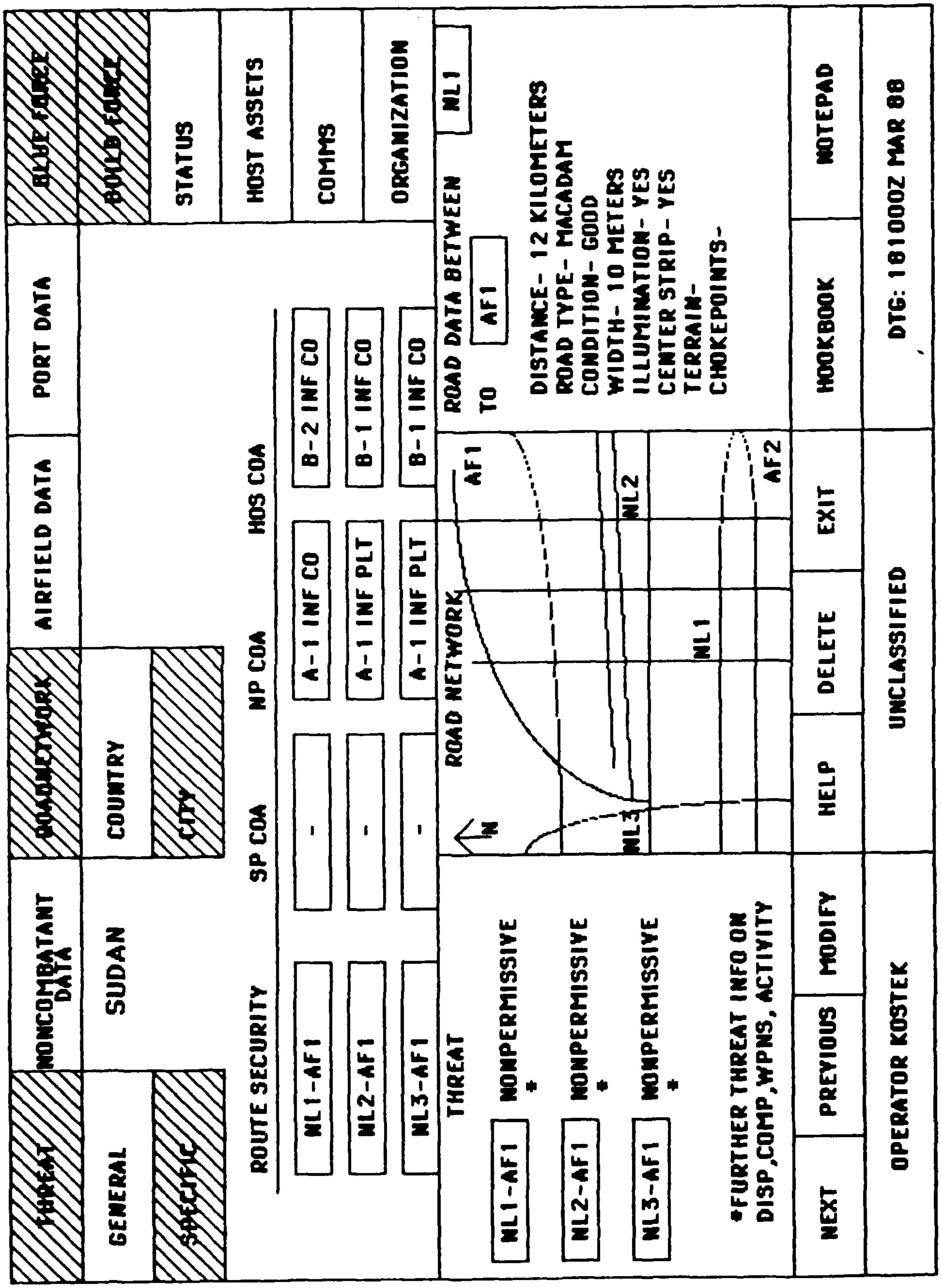


Figure 7 - NEO DSS Screen Display

format which allows for easier access to information.

Third Attempt: TDY to USCENTCOM

Having focused the problem of determining command and control requirements on the NEO force size and type determination process, and keeping in mind the adaptive design approach, another visit was made to J3 and J5 NEO planners at USCENTCOM. It should be noted at this point that CDR Freeman had departed the command and was replaced by LTC O.J. Milano (USMC) as the J5 NEO planner. This change in planners provided an excellent opportunity to test the flexibility of the adaptive design approach in designing a Decision Support System. After approximately eight hours of interviews with two NEO planners, a new concept map was developed along with recommendations to change various screen displays as well as delete and add screen displays within the storyboard. Perhaps the most important part of this visit was the concept map which finally evolved during the interview process. The concept map was restructured and provided a better flow of those planning factors which impacted on the security force size and type determination process. This concept map, contained in Figure 8, neatly summarizes those planning factors. Changes from the initial concept map are enclosed in a dark line. The principal planning factors for determining the type and size of security force needed are

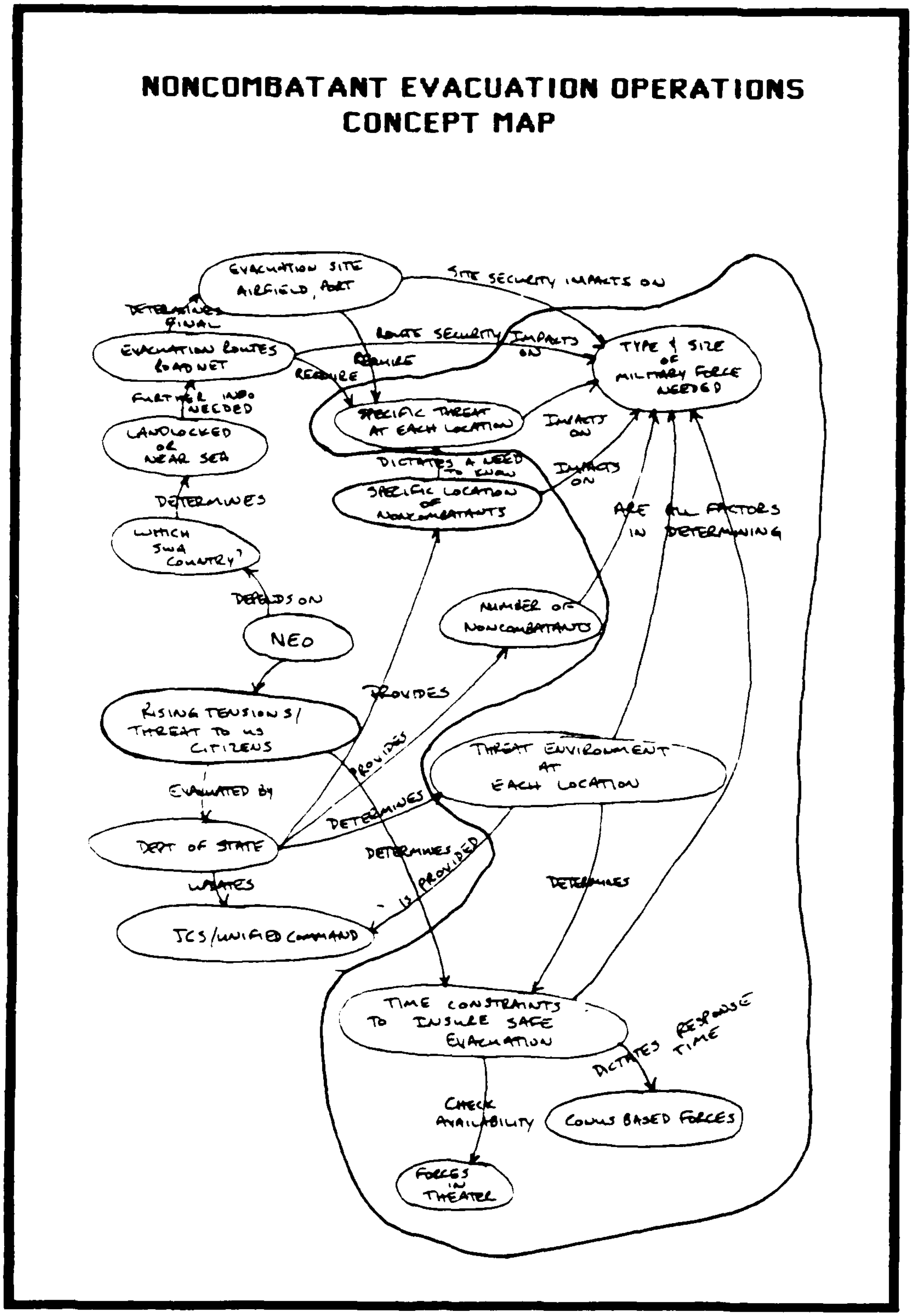


Figure 8 - Final NEO Concept Map

time, distance, and the specific threat environment. One of the more significant points which came out of the interview process was the nature of the impact of the threat. Based on the first interview, a threat environment was determined for the host country as a whole. This in fact is not the case and was resolved during the second interview. The specific threat environment of which there are three (i.e. semipermissive, nonpermissive, hostile) are a function of each site to include each noncombatant location, airfield, and evacuation route. This redefinition of the impact of the threat environment caused many significant changes to be made to the various screen displays within the storyboard, along with an expansion of the storyboard itself.

Refinement of the Storyboard

Based on the interviews at USCENTCOM and the refined concept map, the screen displays contained in the third version of the storyboard reflect the users' requirements and specific needs. This storyboard, a NEO DSS for USCENTCOM, is illustrated in Appendix A of this document. Each screen display within the storyboard is immediately preceded by an explanation of what is taking place within that particular screen display. This explanation along with each screen display provide a continuity flow for the reader to better understand the process which is taking

place within the DSS design.

Feature Chart

The feature chart can also be found on the last page of Appendix A. As discussed in Chapter two, the feature chart depicts the connectivity of the various screen displays within the storyboard. Each screen display represents a step, not necessarily sequential, in the thought process needed to determine the security force size and type for the NEO.

Hookbook

The "hookbook" concept introduced by Lt Col Valusek (Valusek, 1987) was valuable in terms of maintaining a running record of various thoughts, ideas, or suggestions. These ideas affected the direction and scope of the research effort and provided future direction in terms of recommendations for improvement to the DSS. For the purposes of this research effort, the hookbook was maintained manually using 3 X 5 cards. Entries on each card include the date, the specific thought or idea, and the circumstances under which this thought or idea was inspired. At the end of the research effort, all the cards were consolidated and assigned categories (i.e. DSS enhancement or adaptive design). Many of the cards were thrown away since many of the ideas had been incorporated

during the research effort itself. The remaining ideas consist of recommendations for DSS enhancement and recommendations which resulted from the adaptive design process. These "hookbook" items are discussed in further detail in Appendix C.

Summary

In conclusion, the adaptive design process as discussed in Chapter Two was used to address the problem described in Chapter One. A step-by-step description of the application of the adaptive design process used within this research effort was given to include the initial and subsequent development of concept maps and the storyboard. The purpose of the storyboard is to show in pictorial form the ideas reflected in the concept map which mirror those factors which influence the planner's decision process.

Chapter Four summarizes the requirements discovered in the course of this research as well as the application of some models to this DSS. Additionally, comments and recommendations relative to DSS design and particularly the adaptive design approach are discussed. Chapter Four also provides particular recommendations to enhance and improve the NEO DSS design developed in this thesis.

IV CONCLUSIONS AND RECOMMENDATIONS

Introduction

This chapter discusses conclusions and recommendations for the two major areas which influenced the development of this thesis effort. First, some conclusions are provided regarding the design of the Noncombatant Evacuation Operation (NEO) Decision Support System (DSS). Additionally, some recommendations are made regarding the integration of certain models which can support the NEO plan. Second, some conclusions are drawn relating to the use of the adaptive design process in the DSS design. Finally, some recommendations are made for USCENTCOM relative to the NEO DSS and the adaptive design methodology. Additional recommendations for DSS enhancement are contained in Appendix C, Hookbook.

NEO Decision Support System (DSS)

Why the DSS approach? The NEO planning process, and more specifically, the determination of the military security force size and type is a very complex decision process. Referred to as "fuzzy", the decision of what size and type security force is very subjective on the part of the NEO planner and decision maker. It is dependent on a wide range of factors, some of which are: time, distance, and the threat. In this regard, the problem of determining

the military force size and type is relatively unstructured which is common to many decision processes in the command and control arena. Additionally, one of the critical dimensions faced by the NEO planner is the amount of time available to develop a feasible set of alternatives and consequently generate a NEO plan. Dictated by the threat environment facing the noncombatants, the time available for planning may be as little as 24 to 48 hours. Faced with a tremendous amount of information requirements, the limited time available and the unstructured subjectivity of the decision processes involved, it was evident that the NEO planners at USCENTCOM needed an elaborate decision aid. The approach which appeared to satisfy the above constraints was the design and ultimate development of a Decision Support System.

NEO DSS Development

The first cut at the NEO DSS design is complete from the designer's perspective, but should be made available to the user (i.e. USCENTCOM J5) for review and further comments. This review needs to be done before developing the DSS itself, the supporting relational data base, and the determination of the communication links required. The DSS design as incorporated in this thesis in the form of a storyboard serves two purposes. First, the storyboard screen displays with accompanying explanations serves as

documentation for both the user and the DSS builder. The user's embedded training is contained within the storyboard, and consequently there is no need for a separate user's manual to be published. Second, and perhaps more importantly, the thesis constructed around the storyboard as a core serves as the essential statement of requirements. This statement of requirements identifies USCENTCOM's needs in terms of a decision aid which will help determine the appropriate size and type of military force required. However, the determination of this military force size is only the kernel, or initial phase, of this DSS. There is room for considerable expansion of the DSS particularly with the incorporation of some models which will be discussed later. Obviously, no design using the adaptive design process is ever totally complete, but refinements to the design as well as the DSS itself are continuously being made. The potential contribution of the NEO DSS is significant, not only in reducing the amount of planning time needed but also in the determination of a military force size which is supportable and verifiable to some extent (i.e. via SOTACA). In addition to the frequent personnel changes within any military organization and the corresponding lag time in experience and learning the job, the crisis situation of a NEO often demands the creation of ad hoc planning teams versus planning teams already in place. These ad hoc planning teams may have little

experience with a NEO scenario. Consequently, the worth factor of having a NEO DSS, which provides a framework of what factors should be considered in the planner's decision process, cannot be underestimated.

Based on the above discussion, the author strongly recommends that the design of the kernel DSS be implemented as soon as possible.

Model Base Incorporation

There are several places where models can be incorporated into the NEO DSS model base. These enhancements to the model base will not require any models or simulations to be built from scratch since those identified within this thesis have already been developed.

The first, and perhaps most significant, of these models is the State of the Art Contingency Analysis (SOTACA) model. SOTACA is one of two models developed for JCS under the auspices of the Modern Aids to Planning Program (MAPP). SOTACA provides a means to evaluate alternative courses of action which wargames each alternative. SOTACA was designed for small scale force-on-force analysis and this is ideally suited for incorpoation in the NEO process. In this application, SOTACA can be used to verify the size and type of military force structure identified earlier in the DSS. Based on the network established and the given threat, a determination

can be made as to the adequacy of the size and type of the military security force. Presently, USCENTCOM NEO planners use a software program called CONSCREEN to evaluate NEO alternative courses of action. This program appears to be somewhat biased because the values incorporated into CONSCREEN are input by the same individual or group which developed the alternative courses of action. SOTACA, which is a completely separate model although still deterministic, would offer more objectivity in determining force size and type and therefore a better course of action.

Another specific application for SOTACA would be in the determination of an optimal route of evacuation from each noncombatant location to the specific evacuation site (airfield/port). SOTACA is capable of determining the shortest route or the route which takes the least amount of time. The least amount of time route would take into account any anticipated conflict with the enemy along that route. More information relative to the specific application of SOTACA in the NEO DSS model base can be found in Appendix B.

Once the size and type of the military force has been determined, the next step in the process would be to determine the specific logistics and support requirements. Several models are available, one of which is the Logistics DSS developed by J4, JCS (MAPP Conference, 1987). Based on

type unit, mission, and distance involved, a logistics support package is determined and provided to the user.

After the support package has been determined along with the total number of personnel in the military security force and the number of noncombatants, some type of model is needed to determine the specific airlift/sealift requirements. A model called RAPIDSIM developed by J4, JCS is available which which not only determines airlift/sealift requirements but also their availability. It is not known how responsive or time sensitive RAPIDSIM is since it was initially designed to support deliberate planning and not crisis action or contingency planning (MAPP Conference, 1987). Another model which could be used to determine aircraft availability is the Military Airlift Command's (MAC) Global DSS. This DSS is intended to provide instantaneous feedback to the user on the present status of all aircraft belonging to MAC. This data should be accessed via CENTCOM's Command and Control Information System (CCIS).

Interfaces between the NEO DSS and the models or support systems discussed above would be necessary to develop a totally supportable NEO plan.

Adaptive Design Methodology

The adaptive design methodology is an effective approach when compared to the traditional design approach

in terms of flexibility, identification of user needs, and responsiveness to user's changing requirements and desires. A direct consequence of using the adaptive design process was the ability to narrow the problem space and focus on one key area, or kernel, on which to expand. This kernel for the NEO DSS design was the determination of the military force size and type needed to insure the safe evacuation of the noncombatants. The tools (i.e. concept mapping, storyboarding) used in the adaptive design process proved to be extremely valuable and provided the impetus to this thesis effort.

The first tool used in support of the adaptive design methodology was the idea of concept mapping. Concept mapping as discussed in Chapter Two and applied in Chapter Three was instrumental in capturing the problem space and identifying user's needs and requirements. The concept map represented a point of departure for the remainder of the thesis effort. Concept mapping allowed the user to see exactly how his thoughts and explanations were being perceived by the interviewer/designer in pictorial format. If something on the concept map was in error as a result of misinterpretation, feedback from the user was instantaneous and changes to the concept map were immediately made.

The follow-on step to concept mapping was the storyboarding technique also discussed previously in detail. Another extremely valuable tool, storyboarding

allowed the designer to expand on the ideas presented in the concept map. The storyboarding process also proved excellent at capturing further user requirements and focusing on the "kernel" which will serve as the nucleus on which to expand the DSS. The ability of the user to provide the designer with immediate feedback in regard to the screen displays within the storyboard corrected any further misperception and provided future direction. Interest about the DSS was generated and maintained because something was being designed based strictly on user stated needs and requirements and not what the designer thought the user wanted. Also, the user perceived the designer as being very responsive to his needs.

Another direct result of the storyboarding process was that some of the information requirements which were identified as critical information needs on the screen displays triggered the USCENTCOM staff, especially J2 and J5, to satisfy "priority intelligence requirements". Since these requirements have now been identified, the staff can begin satisfying these requirements rather then waiting for the NEO situation to start. Even if the USCENTCOM staff cannot satisfy the requirements now, they can prepare the collection requirements for immediate tasking if the NEO situation occurs.

One of the requirements of using the adaptive design approach is that there needs to be frequent face-to-face

meetings between the user and the designer/builder. This requirement becomes a disadvantage if the user is at a distant location and the designer/builder is constrained by funding constraints along with academic responsibilities which in turn limit the amount of visits which can be conducted. Although there were only two meetings between the USCENTCOM user and designer, the adaptive design methodology still demonstrated a viable and beneficial approach in insuring a common understanding of the problem and the inherent requirements between the user and builder. The traditional approach of systems design is simply inadequate and not responsive to user needs and requirements particularly when there is a great deal of subjectivity involved in the decision process.

Recommendations

This research resulted in the identification of three specific recommendations. First and foremost, USCENTCOM in conjunction with the Air Force Institute of Technology (AFIT) should pursue a course of action which would allow development of the kernel DSS designed as a result of this thesis. The storyboard with the attendent screen displays serve as a statement of requirements and provide a logical starting point for the relational data base development process. As a thesis effort, AFIT students have the capability to deliver a working "kernel" system on which to

expand. The cost for USCENTCOM is minimal in terms of TDY funds for students to visit USCENTCOM.

Second, the data base required to support this NEO Decision Support System will of necessity be quite large. Hopefully, the DSS could use the already existing CCIS data base. Considering the fact that there are seventeen countries in USCENTCOM's area of responsibility, uploading the data base will take considerable time and effort. However, in keeping with the adaptive design premise of starting small and expanding, USCENTCOM should focus its initial efforts on one country (e.g. Sudan). Additionally, to support the data base with current information, all USCENTCOM major staff sections will require access to the data base to provide information updates needed to support the decision process in the event of a NEO. Consequently, recommend that a Local Area Network (LAN) be established between the staff sections and the NEO DSS data base.

Finally, USCENTCOM should initiate a program to design their own decision support systems or aids using the adaptive design methodology. Recognizing the fact that there is usually not enough time or resources available to proceed on any large scale, the focus should be on something small which is needed. In this time of shrinking military budgets, money will become more scarce. Consequently, the availability of contractors should be used to build systems. A considerable amount of contractor

time is spent performing front-end analysis, feasibility studies, and determining requirements. From a user's perspective, this time is wasted. The use of a storyboard allows the user rather than the contractor to state requirements. Using the adaptive design approach, the user will be better able to state and manage his requirements. Based on user familiarity with his job, the user is in the best position to design what he really needs. Keeping this premise in mind, the dollars can be better spent by having the contractor concentrate on building the DSS using the user generated requirements. The author recommends this approach be considered in the future design and building of Decision Support Systems.

APPENDIX A STORYBOARD

This appendix contains the storyboard with the respective screen displays for the kernel system (i.e. military force size and type determination) described in Chapter Three. The storyboard was designed and constructed on the Apple II computer using Macintosh software (i.e. MacDraw).

TITLE SCREEN DISPLAY

-THE SIX WINDOWS AT THE TOP OF THE SCREEN DISPLAY PROVIDE WAYS TO ACCESS THE DATA BASE WHICH IN TURN PROVIDE THE INFORMATION NEEDED TO DETERMINE THE APPROPRIATE MILITARY FORCE SIZE AND TYPE.

-THE EIGHT KEYS AT THE BOTTOM OF THE SCREEN ARE RELATIVELY SELF-EXPLANATORY.

- 'NEXT' KEY ALLOWS THE USER TO ACCESS THE NEXT DISPLAY IN THE PROCESS
- 'PREVIOUS' KEY ALLOWS ALLOWS THE USER TO IMMEDIATELY BRING UP THE PREVIOUS SCREEN DISPLAY
- 'MODIFY' KEY ALLOWS THE USER TO MAKE CHANGES TO THE SCREEN DISPLAY. E.G. MOVING AND CREATING WINDOWS ON THE SCREEN
- 'HELP' KEY PROVIDES USER AN EXPLANATION OF WHAT IS TAKING PLACE RELATIVE TO CURRENT SCREEN DISPLAY BEING VIEWED AND PROVIDE INSTRUCTIONS OF WHREE TO GO
- 'DELETE' KEY ALLOWS USER TO DELETE INFORMATION PREVIOUSLY INPUT BY USER
- 'EXIT' KEY ALLOWS USER TO EXIT PROGRAM AT ANY TIME
- 'HOOKBOOK' KEY ALLOWS USER TO WRITE DOWN THOUGHTS OR IDEAS REGARDING THE IMPROVEMENT OF THE DSS THROUGHOUT THE PROCESS. THIS CAN BE VIEWED AT A LATER TIME BY THE SYSTEM DESIGNER/BUILDER.
- 'NOTEPAD' KEY ALLOWS USER TO MAKE NOTES AS A MEMORY AID TO HIMSELF WHICH HE CAN REFER BACK TO THROUGHOUT THE DECISION PROCESS

THREAT	NONCOMBATANT DATA	ROADNETWORK	AIRFIELD DATA	PORT DATA	BLUE FORCE

NONCOMBATANT EVACUATION

OPERATIONS

DECISION SUPPORT SYSTEM

FOR

US CENTRAL COMMAND

NEXT	PREVIOUS	MODIFY	HELP	DELETE	EXIT	HOOKBOOK	NOTEPAD

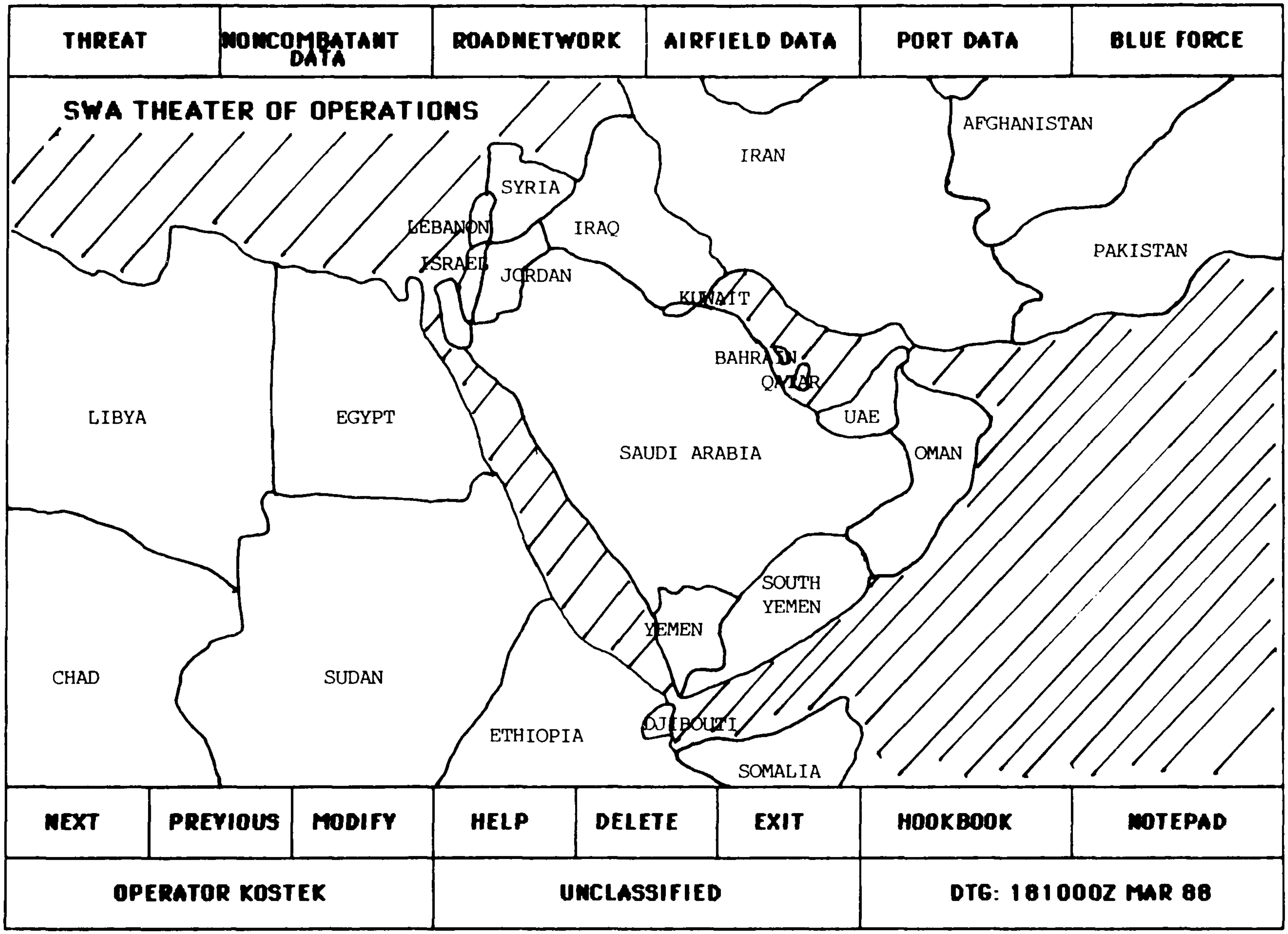
OPERATOR KOSTEK	UNCLASSIFIED	DTG: 181000Z MAR 88

SOUTHWEST ASIA (SWA) THEATER OF OPERATIONS

-THIS SCREEN DISPLAY ALLOWS THE USER TO VIEW THE ENTIRE SWA AREA OF RESPONSIBILITY. IT ILLUSTRATES THE GEOGRAPHIC ORIENTATION OF THIS DECISION PROCESS SINCE THE MAJORITY OF NONCOMBATANTS WILL BE ROUTED FROM HOST COUNTRY TO CAIRO-WEST IN EGYPT.

-MOVEMENT OF CURSOR OVER COUNTRY NAME WILL BRING UP A MAP OF THAT COUNTRY ON THE NEXT SCREEN DISPLAY.

-ACCORDINGLY, THE DATA BASE WILL BE ACCESSED TO THAT SPECIFIC COUNTRY. IN THIS RESEARCH EFFORT, THE COUNTRY OF INTEREST IS SUDAN.

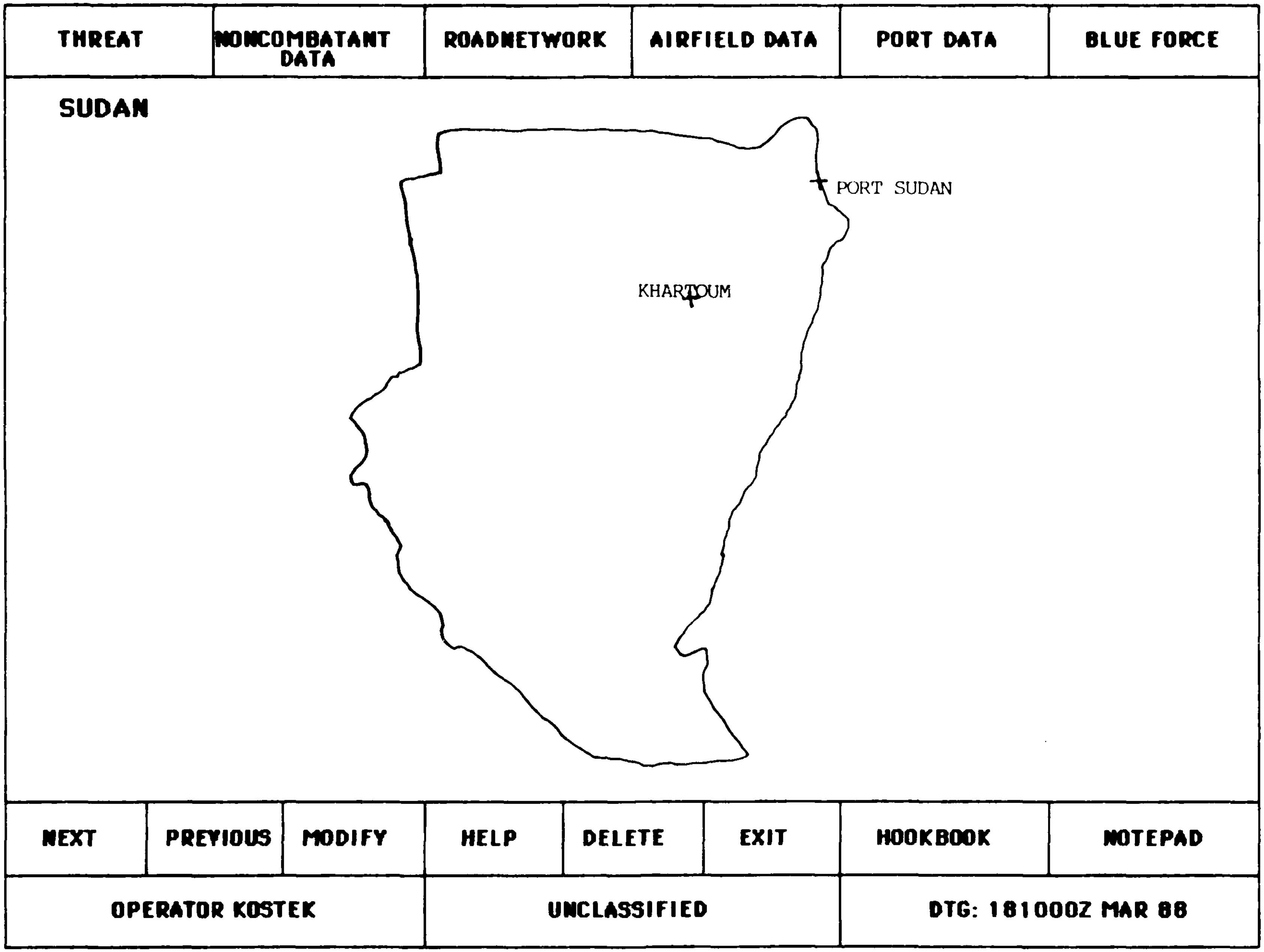

THREAT
NONCOMBATANT DATA
ROADNETWORK
AIRFIELD DATA
PORT DATA
BLUE FORCE
SWA THEATER OF OPERATIONS
AFGHANISTAN
IRAN
SYRIA
LEBANON
IRAQ
PAKISTAN
ISRAEL
JORDAN
KUWAIT
BAHRAIN
QATAR
UAE
LIBYA
EGYPT
SAUDI ARABIA
OMAN
SOUTH YEMEN
YEMEN
CHAD
SUDAN
ETHIOPIA
DJIBOUTI
SOMALIA
NEXT
PREVIOUS
MODIFY
HELP
DELETE
EXIT
HOOKBOOK
NOTEPAD
OPERATOR KOSTEK
UNCLASSIFIED
DTG: 181000Z MAR 88

MAP OF SUDAN

-SCREEN DISPLAY DEPICTS SPECIFIC COUNTRY OF INTEREST WHICH WAS IDENTIFIED IN THE PREVIOUS SCREEN DISPLAY.

-THE MAP HIGHLIGHTS THOSE CITIES WHERE U.S. NONCOMBATANTS ARE LOCATED. IN THIS CASE, THE NONCOMBATANTS ARE LOCATED IN KHARTOUM AND PORT SUDAN.

-THE SIX WINDOWS AT THE TOP OF THE SCREEN DISPLAY PROVIDE THE USER THE OPPORTUNITY TO SELECT WHICH INFORMATION IS GOING TO BE VIEWED AND IN WHAT ORDER.

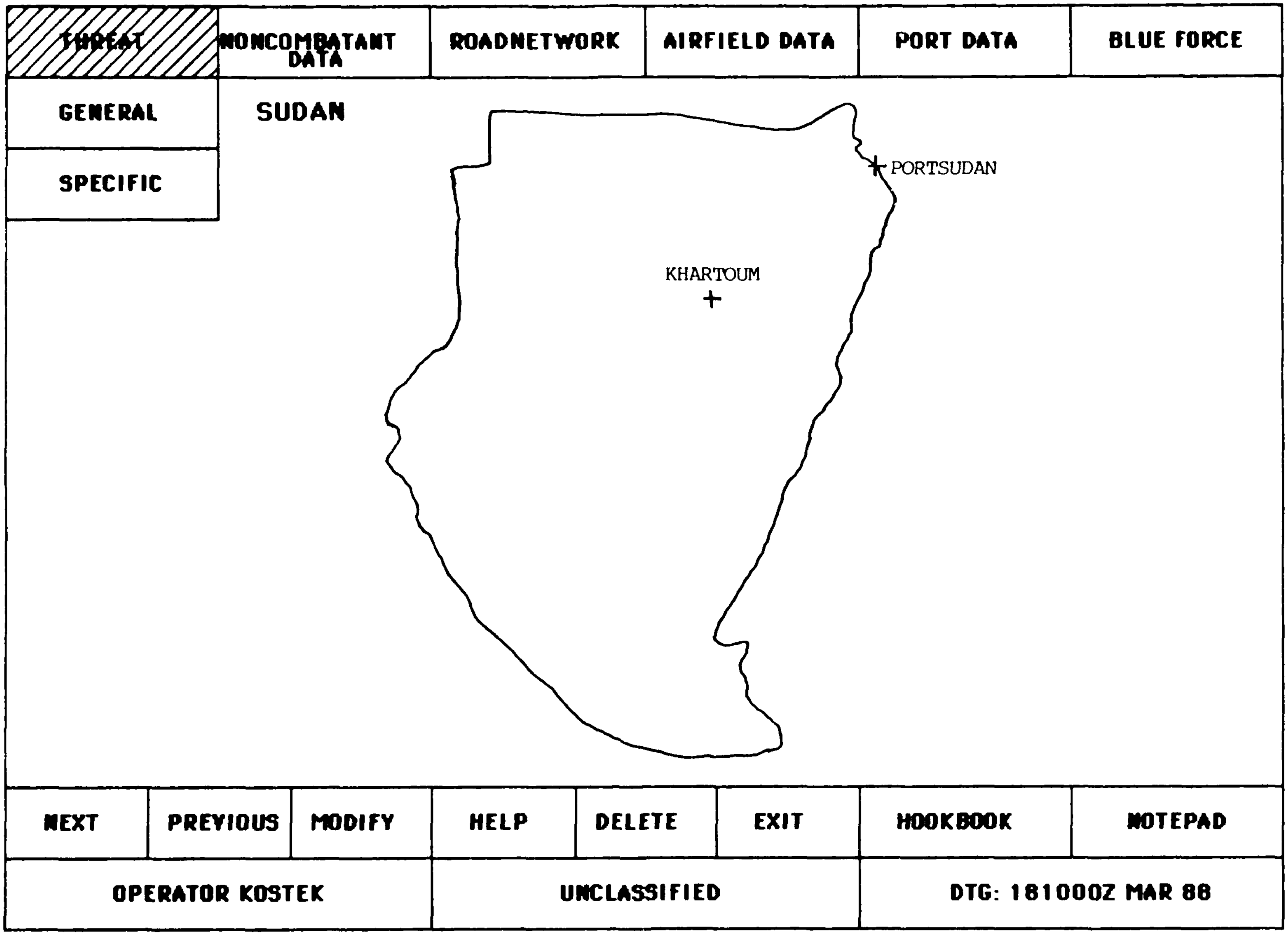

THREAT
NONCOMBATANT DATA
ROADNETWORK
AIRFIELD DATA
PORT DATA
BLUE FORCE
SUDAN
PORT SUDAN
KHARTOUM
NEXT
PREVIOUS
MODIFY
HELP
DELETE
EXIT
HOOKBOOK
NOTEPAD
OPERATOR KOSTEK
UNCLASSIFIED
DTG: 181000Z MAR 88

THREAT IN SUDAN

-IN THIS SCREEN DISPLAY. THE USER HAS JUST MOVED THE CURSOR OVER THE WINDOW LABELED THREAT, DESIRING INFORMATION RELATIVE TO THE THREAT FACING THE NONCOMBATANTS IN SUDAN.

-THIS THREAT INFORMATION WOULD HAVE TO BE INPUT AND MAINTAINED IN THE DATA BASE BY J2, USCENTCOM IN THE EVENT OF A NEO.

-TWO WINDOWS BELOW THE 'THREAT' WINDOW HAVE BEEN DRAWN DOWN AS A RESULT AND THE USER MUST SELECT WHICH LEVEL OF THREAT INFORMATION IS DESIRED, GENERAL OR SPECIFIC. GENERAL INFORMATION PROVIDES A GENERAL POLITICAL SITUATION IN THE COUNTRY AND SPECIFIC THREAT INFORMATION PERTAINS TO THE THREAT AT SPECIFIC NONCOMBATANT LOCATIONS, EVACUATION ROUTES, AND EXIT POINTS (E.G. AIRFIELDS, SEAPORTS).


THREAT
NONCOMBATANT DATA
ROADNETWORK
AIRFIELD DATA
PORT DATA
BLUE FORCE
GENERAL
SPECIFIC
SUDAN
PORTSUDAN
KHARTOUM
NEXT
PREVIOUS
MODIFY
HELP
DELETE
EXIT
HOOKBOOK
NOTEPAD
OPERATOR KOSTEK
UNCLASSIFIED
DTG: 181000Z MAR 88

GENERAL THREAT IN SUDAN

-THIS SCREEN DISPLAY DEPICTS THAT THE USER WANTS AN OVERALL OR GENERAL THREAT SITUATION UPDATE OR WHAT IS REFERRED TO AS THE PRESENT POLITICAL SITUATION.

-THE POLITICAL SITUATION APPEARS AS A WINDOW ON THE SCREEN DISPLAY SO THAT THE GEOGRAPHIC ORIENTATION OF CONDUCTING A NEO IN SUDAN, SPECIFICALLY KHARTOUM IS ALWAYS IN THE MIND OF THE USER.

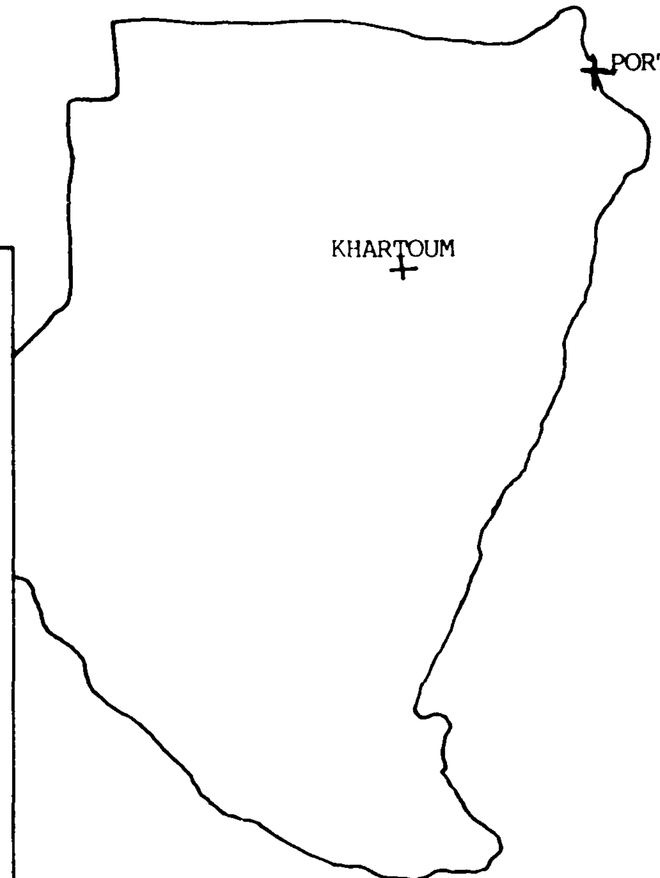
-THE POLITICAL SITUATION WHICH IS UPDATED AND INPUT BY J2, USCENTCOM IS A BRIEF SUMMARY DESCRIBING THE EVENTS LEADING TO THE DECISION BY THE STATE DEPARTMENT (I.E. SUDAN AMBASSADOR) TO CONDUCT NONCOMBATANT EVACUATION OPERATIONS WITH MILITARY SUPPORT. THE WINDOW WILL SCROLL THE SITUATION IF A CONTINUATION PORTION IS NEEDED.

THREAT	NONCOMBATANT DATA	ROADNETWORK	AIRFIELD DATA	PORT DATA	BLUE FORCE

GENERAL

SPECIFIC

SUDAN



PRESENT POLITICAL SITUATION

STATE DEPT REQUESTED DOD SUPPORT OF SUDAN NEO ON 172300Z MAR 88. SITUATION IN KHARTOUM DETERIORATING RAPIDLY.

ANTI-AMERICAN FERVOR BEING GENERATED BY RIGHTIST SECT OF SIKH FAITH AS A RESULT OF AMERICAN ATTACK AGAINST IRANIAN SHORE BASED MISSILE BATTERIES.

SUDANESE GOVT UNABLE TO INSURE ADEQUATE PROTECTIVE MEASURES.

HOSTILE ENVIRONMENT BASED ON SPECIFIC NONCOMBATANT LOCATION.

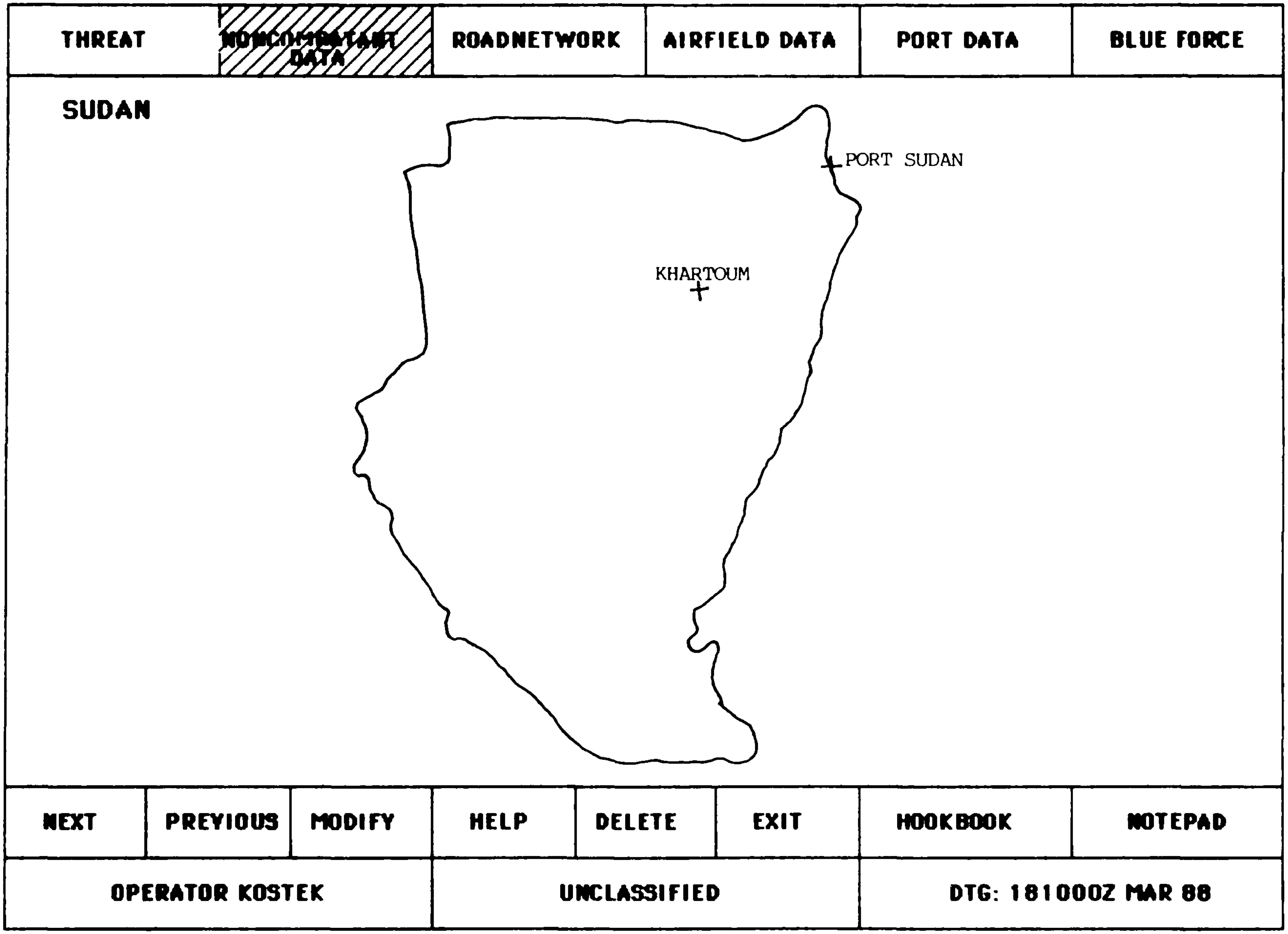
NEXT	PREVIOUS	MODIFY	HELP	DELETE	EXIT	HOOKBOOK	NOTEPAD

OPERATOR KOSTEK	UNCLASSIFIED	DTG: 181000Z MAR 88

NONCOMBATANT DATA FOR SUDAN

-THIS SCREEN DISPLAY ILLUSTRATES THAT THE USER DESIRES INFORMATION RELATIVE TO NONCOMBATANT DATA IN SUDAN.

-THE WINDOW DEPICTING THE POLITICAL SITUATION IN SUDAN HAS BEEN REMOVED, JUST LEAVING THE MAP OF SUDAN ON THE CURRENT SCREEN DISPLAY.


THREAT
NONCOMBATANT DATA
ROADNETWORK
AIRFIELD DATA
PORT DATA
BLUE FORCE
SUDAN
PORT SUDAN
KHARTOUM
NEXT
PREVIOUS
MODIFY
HELP
DELETE
EXIT
HOOKBOOK
NOTEPAD
OPERATOR KOSTEK
UNCLASSIFIED
DTG: 181000Z MAR 88

NONCOMBATANT DATA FOR KHARTOUM

-AS A CONSEQUENCE OF THE USER HIGHLIGHTING NONCOMBATANT DATA FROM THE PREVIOUS SCREEN DISPLAY, TWO WINDOWS BELOW THE 'NONCOMBATANT DATA' WINDOW HAVE BEEN DRAWN DOWN. THESE WINDOWS REFLECT THOSE CITIES IN SUDAN WHERE U.S. NONCOMBATANTS ARE LOCATED.

-IN THIS SCREEN DISPLAY, SINCE THE ONLY THREAT TO NONCOMBATANTS IS IN KHARTOUM, THE USER HAS MOVED THE CURSOR DOWN TO THE 'KHARTOUM' WINDOW DESIRING NONCOMBATANT DATA FOR KHARTOUM.

-THE DATA FOR THIS SCREEN DISPLAY, SPECIFICALLY DEALING WITH THE BREAKOUT AND NUMBERS OF U.S. NONCOMBATANTS IS PROVIDED BY THE EMBASSY TO USCENTCOM EVERY SIX MONTHS VIA GENSER ELECTRICAL MESSAGE. DATA FOR THIS DISPLAY WOULD HAVE TO BE INPUT BY J5.

-SINCE THIS INFORMATION IS RECEIVED AND UPDATED EVERY SIX MONTHS ONLY, IT IS CRITICAL FOR USCENTCOM PLANNERS TO HAVE PERIODIC UPDATES AS THE SITUATION IN THE HOST COUNTRY DETERIORATES.

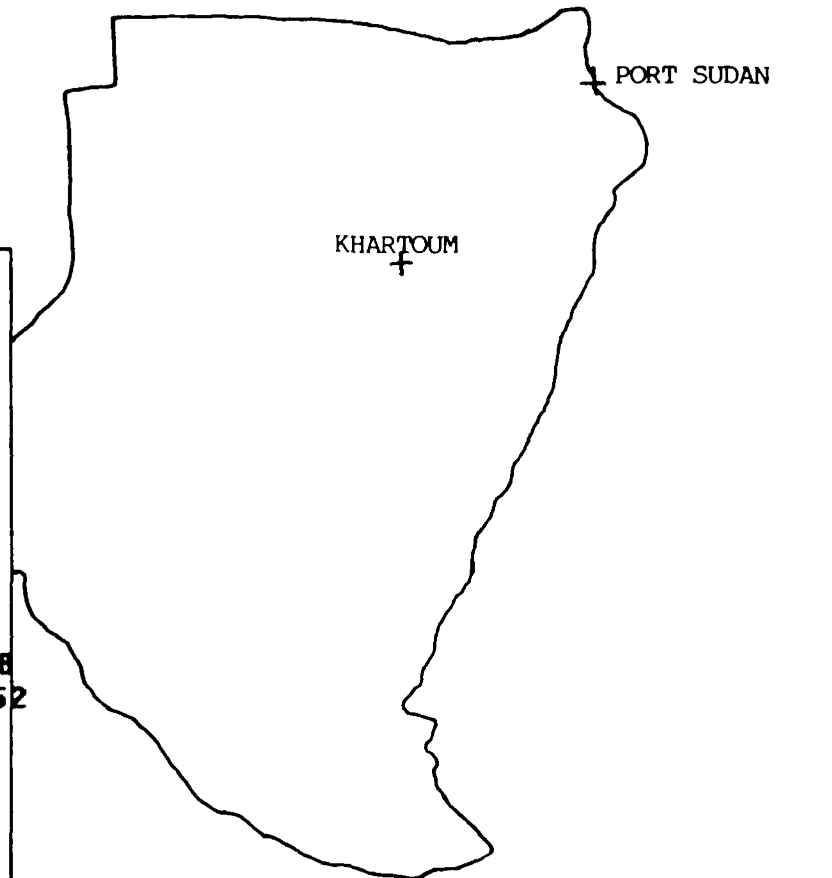
-USER MAY DESIRE TO MAKE A MEMORY NOTE USING 'NOTEPAD' KEY PERTAINING TO THE NUMBER OF NONCOMBATANTS IN KHARTOUM.

THREAT	NONCOMBATANT DATA	ROADNETWORK	AIRFIELD DATA	PORT DATA	BLUE FORCE

SUDAN

KHARTOUM

PORT SUDAN



KHARTOUM NONCOMBATANT DATA,
CURRENT AS OF 281000Z FEB 88.

DOD PERSONNEL---------------------------56
DOD NONCOMBATANTS----------------280
DEPENDENT DOD-------------------------43
DEPENDENT DOD NONCOMBATANTS-----76
USG AM EMPLOYEES--------------------48
USG NON-US EMPLOYEES----------------12
USG HIRED CONTRACT------------------16
STUDENTS--------------------------------8
TOURISTS--------------------------------52

TOTAL 591

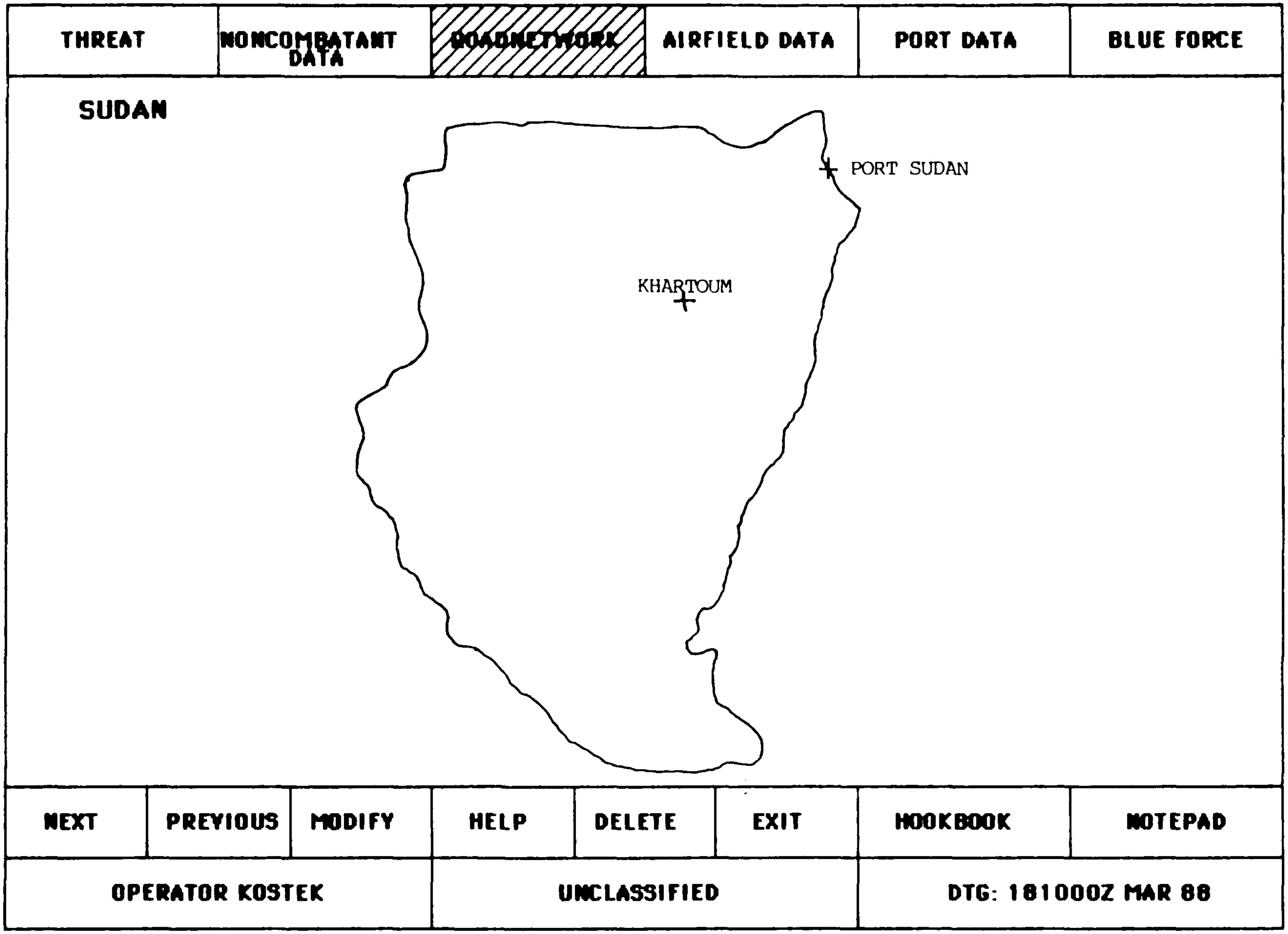
NEXT	PREVIOUS	MODIFY	HELP	DELETE	EXIT	HOOKBOOK	NOTEPAD

OPERATOR KOSTEK | UNCLASSIFIED | DTG: 181000Z MAR 88

ROAD NETWORK FOR SUDAN

-THIS SCREEN DISPLAY SHOWS THAT THE USER DESIRES INFORMATION RELATIVE TO THE ROAD NETWORK IN SUDAN.

-THE WINDOW DEPICTING NONCOMBATANT IN KHARTOUM HAS BEEN REMOVED, JUST LEAVING THE MAP OF SUDAN ON THE CURRENT SCREEN DISPLAY.


THREAT
NONCOMBATANT DATA
ROADNETWORK
AIRFIELD DATA
PORT DATA
BLUE FORCE
SUDAN
PORT SUDAN
KHARTOUM
NEXT
PREVIOUS
MODIFY
HELP
DELETE
EXIT
HOOKBOOK
NOTEPAD
OPERATOR KOSTEK
UNCLASSIFIED
DTG: 181000Z MAR 88

ROAD NETWORK FOR SUDAN

-AS A CONSEQUENCE OF THE USER HIGHLIGHTING ROADNETWORK FROM THE PREVIOUS SCREEN DISPLAY. TWO WINDOWS BELOW THE 'ROADNETWORK' WINDOW HAVE BEEN DRAWN DOWN. THESE WINDOWS REFLECT WHICH LEVEL OF ROADNETWORK DATA IS WANTED, EITHER SUDAN AS A COUNTRY OR SOME SPECIFIC CITY.

-IN THIS SCREEN DISPLAY, THE USER HAS ELECTED TO VIEW THE ROADNETWORK FOR SUDAN AND THEREFORE MOVED THE CURSOR DOWN FROM ROADNETWORK TO COUNTRY.

-IN ADDITION TO A MAP OF SUDAN DEPICTING THE MAJOR ROADWAYS WITHIN THE COUNTRY, A WINDOW POPS UP ON THE SCREEN WHICH WILL PROVIDE MORE SPECIFIC ROAD DATA BASED ON USER INPUT.

-OTHER THEN THE WINDOWS AND KEYS DISPLAYED ON THE SCREEN, ANY BLOCKS REPRESENT USER INPUT. IN THIS DISPLAY, THE USER HAS INDICATED THAT HE WANTS ROAD DATA BETWEEN KHARTOUM AND PORT SUDAN.

-THE INFORMATION WITHIN THIS WINDOW IS THEN DISPLAYED BASED ON USER INPUT. THE INFORMATION DESIRED IS BASED ON USCENTCOM NEO PLANNER NEEDS.

THREAT	NONCOMBATANT DATA	ROADNETWORK	AIRFIELD DATA	PORT DATA	BLUE FORCE

SUDAN

COUNTRY

CITY

ROAD DATA BETWEEEN KHARTOUM AND PORT SUDAN

DISTANCE-------------------420 KILOMETERS

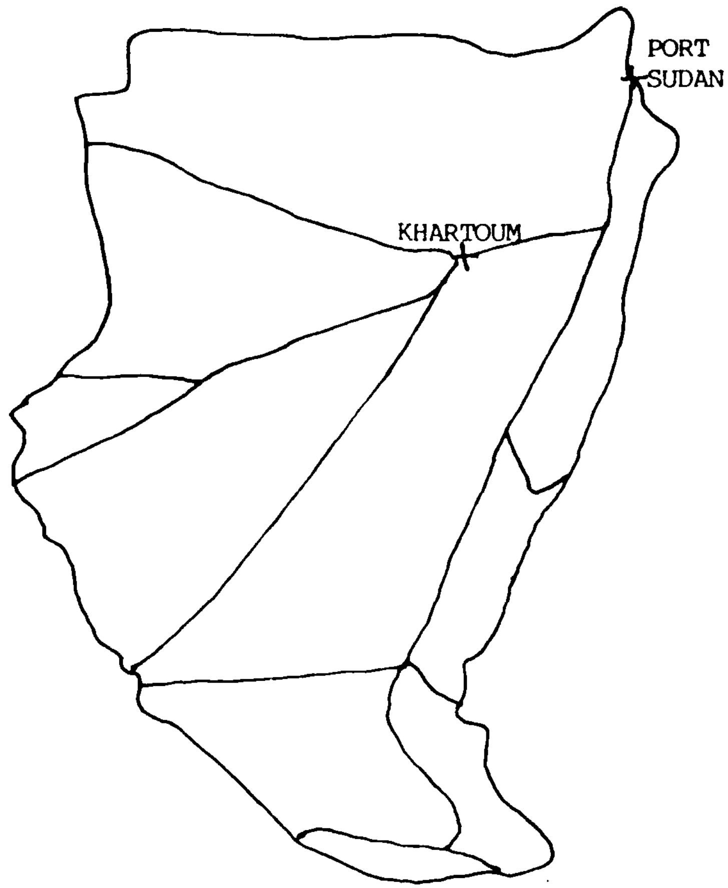
ROADTYPE------------------BLACKTOP

CONDITION-----------------GOOD

WIDTH---------------------30 METERS

TERRAIN---TERRAIN INFORMATION WILL BE DISPLAYED VIA SOME TYPE OF MAP AND DIGITIZED BOARD.

OTHER INFORMATION-------AS NEEDED



NEXT	PREVIOUS	MODIFY	HELP	DELETE	EXIT	HOOKBOOK	NOTEPAD

OPERATOR KOSTEK	UNCLASSIFIED	DTG: 181000Z MAR 88

ROADNETWORK FOR KHARTOUM

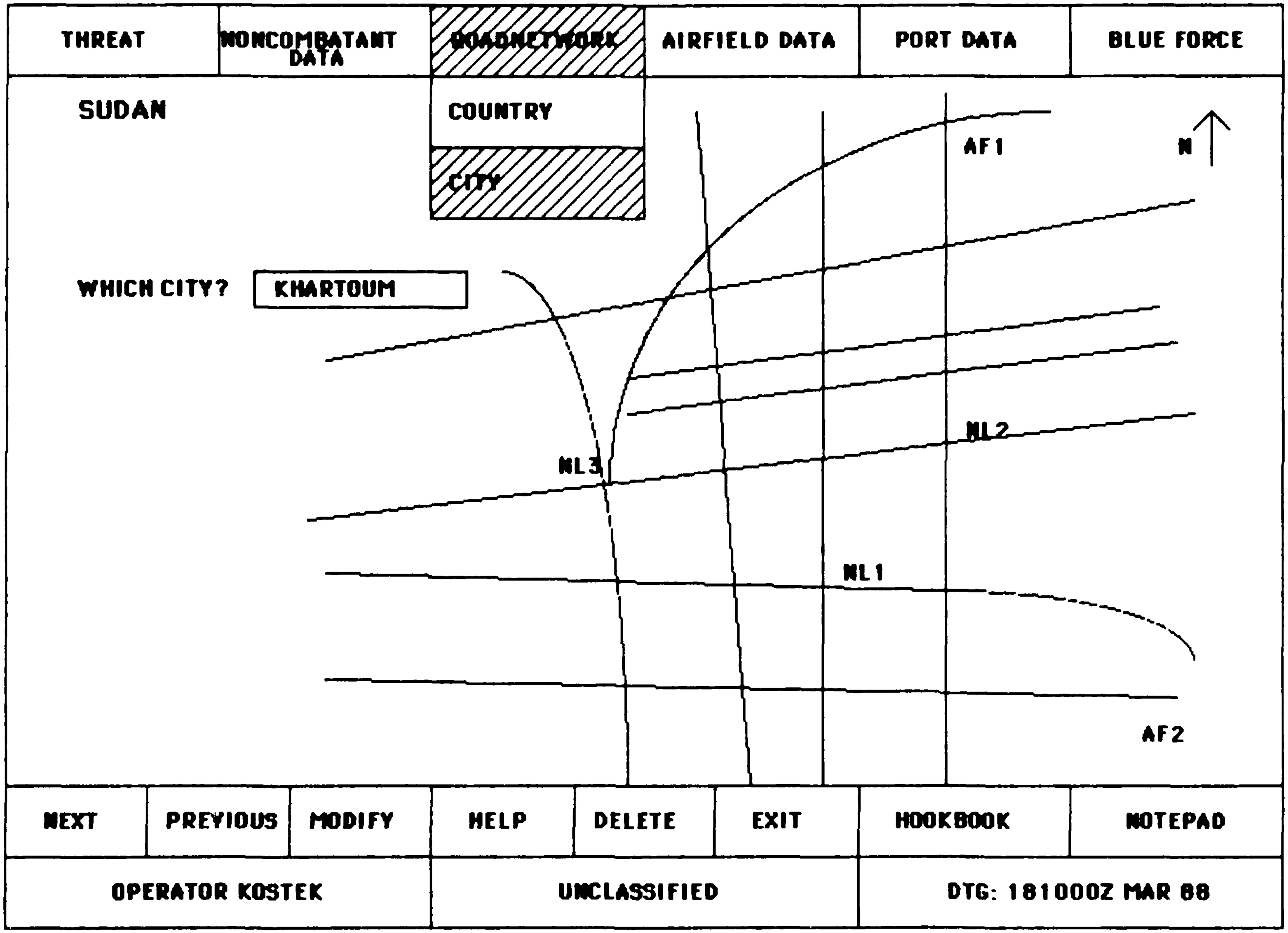
-IN THIS SCREEN DISPLAY, THE USER HAS DECIDED TO VIEW THE ROADNETWORK FOR KHARTOUM AND CONSEQUENTLY HAD TO MOVE THE CURSOR DOWN FROM COUNTRY TO CITY.

-THE SUPPORT SYSTEM QUERIES THE USER AS TO WHICH CITY THE ROADNETWORK IS NEEDED. THE DATA BASE WOULD HOLD ALL THE NECESSARY CITY MAPS WHERE U.S. NONCOMBATANTS ARE LOCATED.

-AGAIN, THE USER MUST TYPE IN THE CITY OF INTEREST IN THIS DISPLAY. THAT CITY IS KHARTOUM.

-THE CITY MAP ITSELF IS NOT THAT DETAILED DUE TO SCREEN SIZE LIMITATIONS. HOWEVER, IT WILL DEPICT MAJOR STREETS/AVENUES AS WELL AS NONCOMBATANT LOCATIONS (E.G. NL1, NL2, NL3) AND AIRFIELDS (E.G. AF1,AF2).

-ROUTES WOULD BE USED FOR EVACUATION PLANNING PURPOSES FROM NONCOMBATANT LOCATION BASED ON SPECIFIC THREAT ENVIRONMENT ALONG THAT ROUTE.

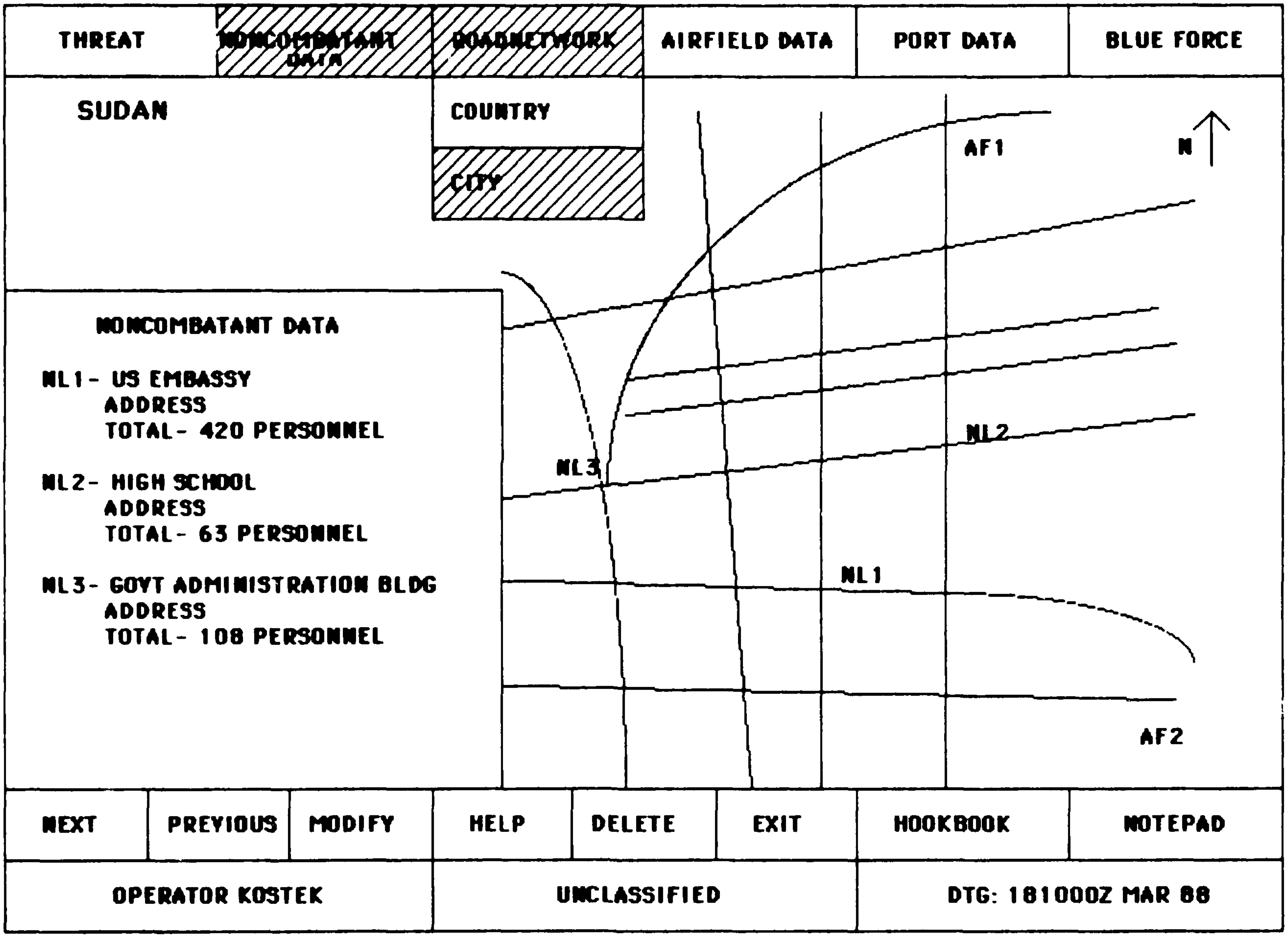

THREAT
NONCOMBATANT DATA
ROADNETWORK
AIRFIELD DATA
PORT DATA
BLUE FORCE
SUDAN
COUNTRY
CITY
WHICH CITY?
KHARTOUM
AF1
N
NL2
NL3
NL1
AF2
NEXT
PREVIOUS
MODIFY
HELP
DELETE
EXIT
HOOKBOOK
NOTEPAD
OPERATOR KOSTEK
UNCLASSIFIED
DTG: 181000Z MAR 88

NONCOMBATANT DATA WITH CITY ROADNETWORK

-IN THIS SCREEN DISPLAY, THE USER WANTS TO VIEW NONCOMBATANT DATA ALONG WITH THE ROADNETWORK OF KHARTOUM. THE 'MODIFY' KEY MUST BE USED TO CREATE A SEPARATE SCREEN WINDOW.

-THIS SEPARATE WINDOW OF NONCOMBATANT DATA PROVIDES A BRIEF DESCRIPTION OF EACH NONCOMBATANT LOCATION (I.E. NL1, NL2, NL3), THE CURRENT STREET ADDRESS, AND THE TOTAL NUMBER OF NONCOMBATANTS AT THAT LOCATION.

-THE CITY MAP AGAIN PROVIDES THE USER A QUICK GEOGRAPHIC REFERENCE AS TO NONCOMBATANT LOCATION VERSUS EVACUATION AIRFIELD.


THREAT
NONCOMBATANT DATA
ROADNETWORK
AIRFIELD DATA
PORT DATA
BLUE FORCE
SUDAN
COUNTRY
CITY
AF1
N
NL2
NL3
NL1
AF2
NONCOMBATANT DATA
NL1 - US EMBASSY
ADDRESS
TOTAL - 420 PERSONNEL
NL2 - HIGH SCHOOL
ADDRESS
TOTAL - 63 PERSONNEL
NL3 - GOVT ADMINISTRATION BLDG
ADDRESS
TOTAL - 108 PERSONNEL
NEXT
PREVIOUS
MODIFY
HELP
DELETE
EXIT
HOOKBOOK
NOTEPAD
OPERATOR KOSTEK
UNCLASSIFIED
DTG: 181000Z MAR 88

AIRFIELD DATA WITH CITY ROADNETWORK

-AS IN THE PREVIOUS SCREEN DISPLAY, THE USER HAS ELECTED TO VIEW AIRFIELD DATA ALONG WITH THE ROADNETWORK OF KHARTOUM. AGAIN, THE 'MODIFY' KEY MUST BE USED.

-THE AIRFIELD DATA REQUIREMENTS WERE GENERATED BY USCENTCOM J5 PLANNERS. THIS DATA BASE WOULD HAVE TO BE DEVELOPED AND MAINTAINED BY J5. CURRENT WEATHER CONDITIONS AT EACH AIRFIELD WOULD HAVE TO BE PROVIDED THROUGH J2 CHANNELS.

-AGAIN, A SEPARATE WINDOW ON THE DISPLAY PROVIDES THE USER A QUICK GEOGRAPHIC REFERENCE BETWEEN AIRFIELD DATA AND SPECIFIC LOCATION OF THE AIRFIELD.

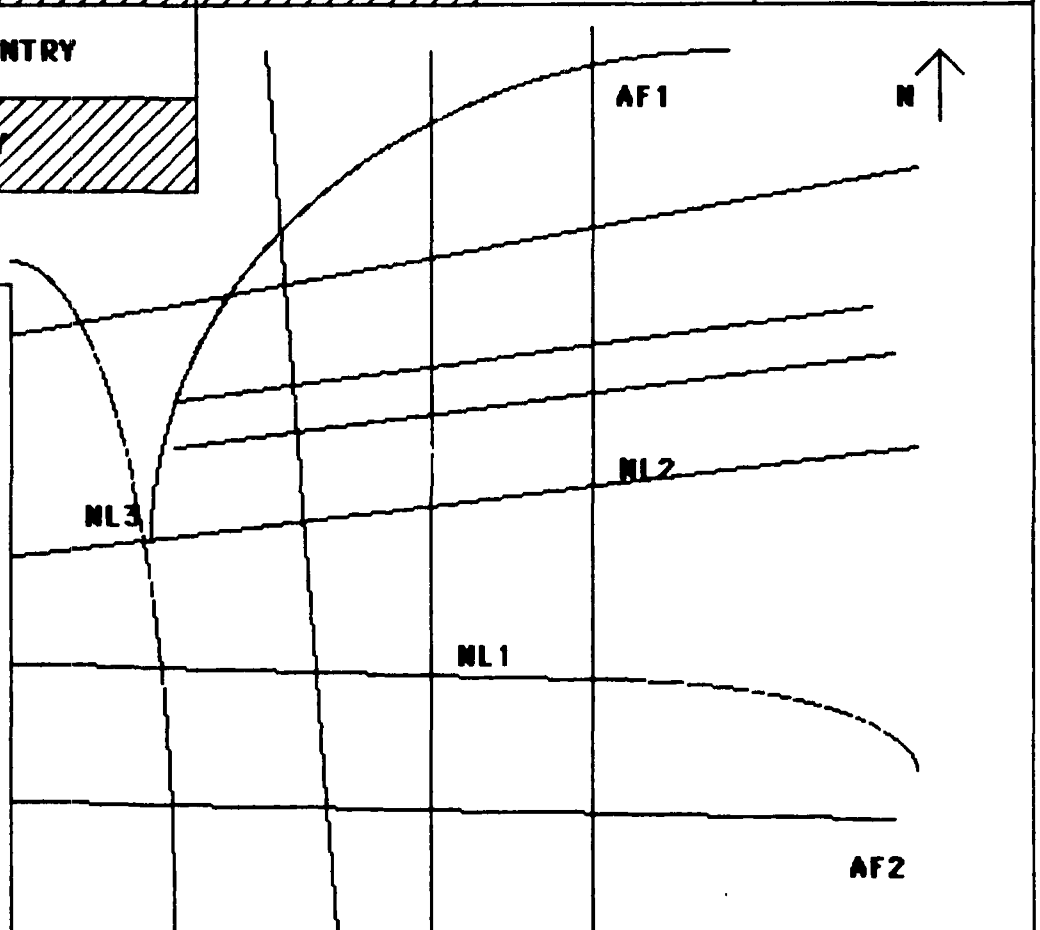
-THE AIRFIELD DATA WINDOW WOULD CONTINUE TO SCROLL UNTIL ALL DATA WHICH THE USER WANTS IS SEEN.

THREAT	NONCOMBATANT DATA	ROADNETWORK	AIRFIELD DATA	PORT DATA	BLUE FORCE

SUDAN

COUNTRY

CITY



AIRFIELD DATA

AIRFIELD 1- KHARTOUM AIRPORT
LOCATION- LAT/LONG AND
SIX DIGIT GRID
LENGTH- 7800 FT
WIDTH- 150 FT
ALTITUDE- 780 METERS
TAXIWAY COMPOSITION-
RUNWAY GRADIENT-
APRON CAPACITY-
GRD SPT EQUIPMENT-
MAINTENANCE SPT-
FUEL AVAILABILITY-
AIRFIELD LIGHTING-
INSTRUMENTED-
COMMS AVAILABLE-
WEATHER CONDITIONS-

NEXT	PREVIOUS	MODIFY	HELP	DELETE	EXIT	HOOKBOOK	NOTEPAD

OPERATOR KOSTEK	UNCLASSIFIED	DTG: 181000Z MAR 88

PORT DATA

-IN THIS SCREEN DISPLAY, THE USER DESIRES TO CALL UP INFORMATION JUST ON PORT DATA. SINCE MOST COUNTRIES IN USCENTCOM'S AOR ARE BOUNDED BY THE SEA, PORT FACILITIES MAY BE MORE READILY AVAILABLE FOR EVACUATION OPERATIONS. AGAIN, INFORMATION IS CALLED BY THE USER BY MOVING THE CURSOR DIRECTLY OVER THE WINDOW CALLED PORT DATA.

-THE SCREEN THEN PROMPTS THE USER BY A QUERY AS TO WHICH PORT INFORMATION IS DESIRED. IF THE USER DOES NOT KNOW WHICH PORT NAME TO TYPE IN, THE USER CAN MOVE THE CURSOR TO THE 'HELP' KEY WHICH IN TURN WILL PROVIDE A LISTING OF ALL PORT FACILITIES FOR THAT SPECIFIC COUNTRY.

-IN THIS DISPLAY, THE USER DESIRES PORT DATA FOR PORT SUDAN. THE SUPPORT SYSTEM THEN PROVIDES A DIAGRAM OF THE PORT FACILITIES TO INCLUDE PIERS AND DOCKS ALONG WITH A WINDOW WHICH PROVIDES DETAILS ABOUT THE SPECIFIC PORT.

-THE DATA BASE FOR THE PORT DATA WOULD HAVE TO BE DEVELOPED AND UPDATED BY BOTH J5 AND J2.

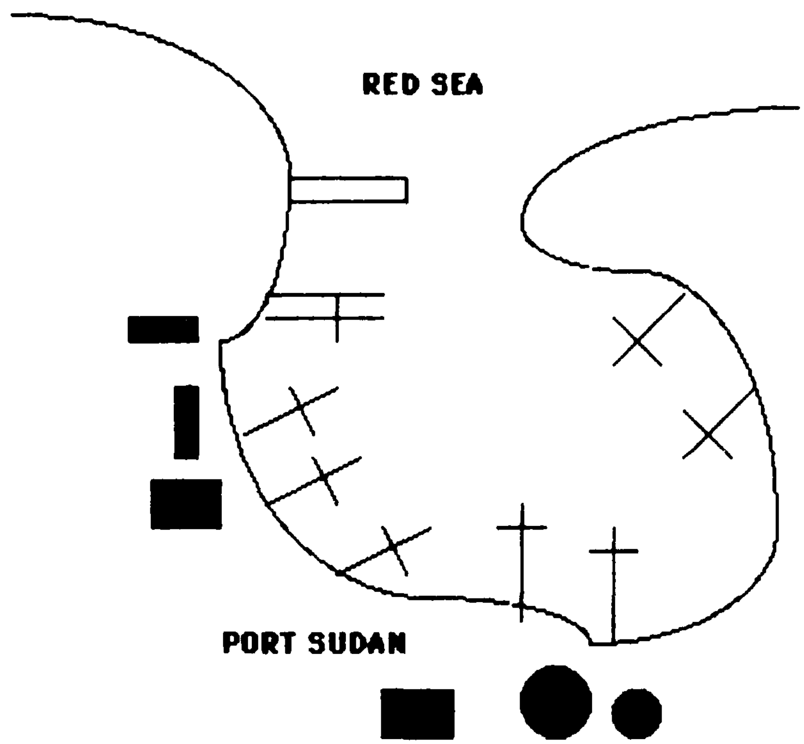
THREAT | NONCOMBATANT DATA | ROADNETWORK | AIRFIELD DATA | PORT DATA | BLUE FORCE

SUDAN

WHICH PORT? PORT SUDAN

PORT DATA

DEPTH-
TIDES-
SURF CONDITIONS ALONG BEACHES-
SHOALS-
SANDBARS-
NAVIGATIONAL AIDS-
BUOYS-
DOCK FACILITY STATUS-
WEATHER CONDITIONS-



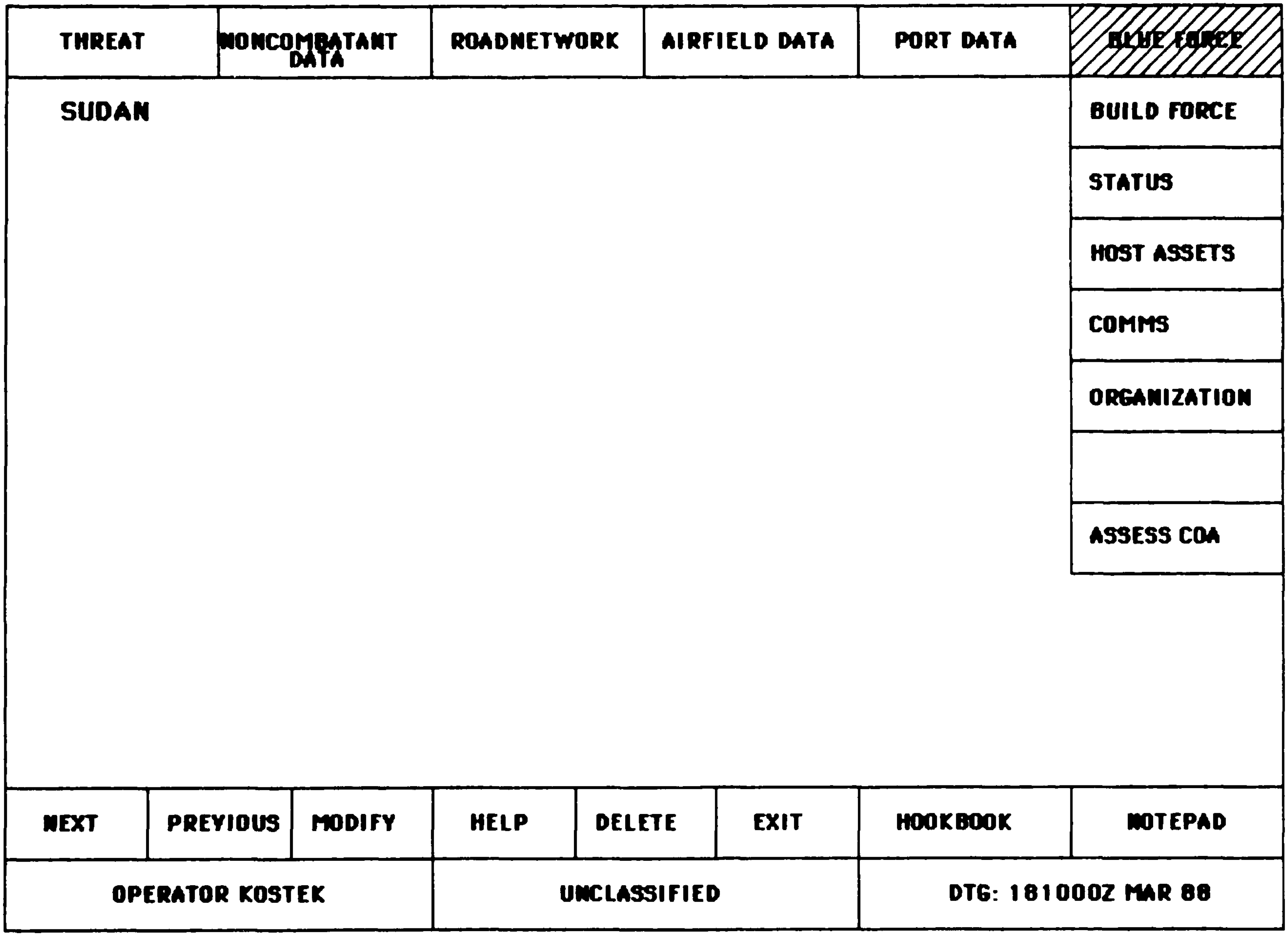
NEXT | PREVIOUS | MODIFY | HELP | DELETE | EXIT | HOOKBOOK | NOTEPAD

OPERATOR KOSTEK | UNCLASSIFIED | DTG: 181000Z MAR 88

BLUE FORCE

-THIS SCREEN DISPLAY IS THE FIRST IN A SEQUENCE OF SCREEN DISPLAYS THAT ARE INVOLVED IN SPECIFICALLY BUILDING THE BLUE FORCE (I.E. THE SIZE AND TYPE OF U.S. COMBAT FORCE NEEDED TO INSURE THE SECURITY OF THE NONCOMBATANTS).

-THE USER MOVES THE CURSOR OVER BLUE FORCE AND SEVEN WINDOWS BELOW THE 'BLUE FORCE' WINDOW ARE DRAWN DOWN. THESE SUBORDINATE WINDOWS REFLECT VARIOUS CATEGORIES NEEDED TO DEVELOP THE FORCE, PROVIDE INPUT TO SUPPORT THE NEO PLANNING PROCESS, AND ASSESS THE VARIOUS COURSES OF ACTION WHICH ARE DEVELOPED.

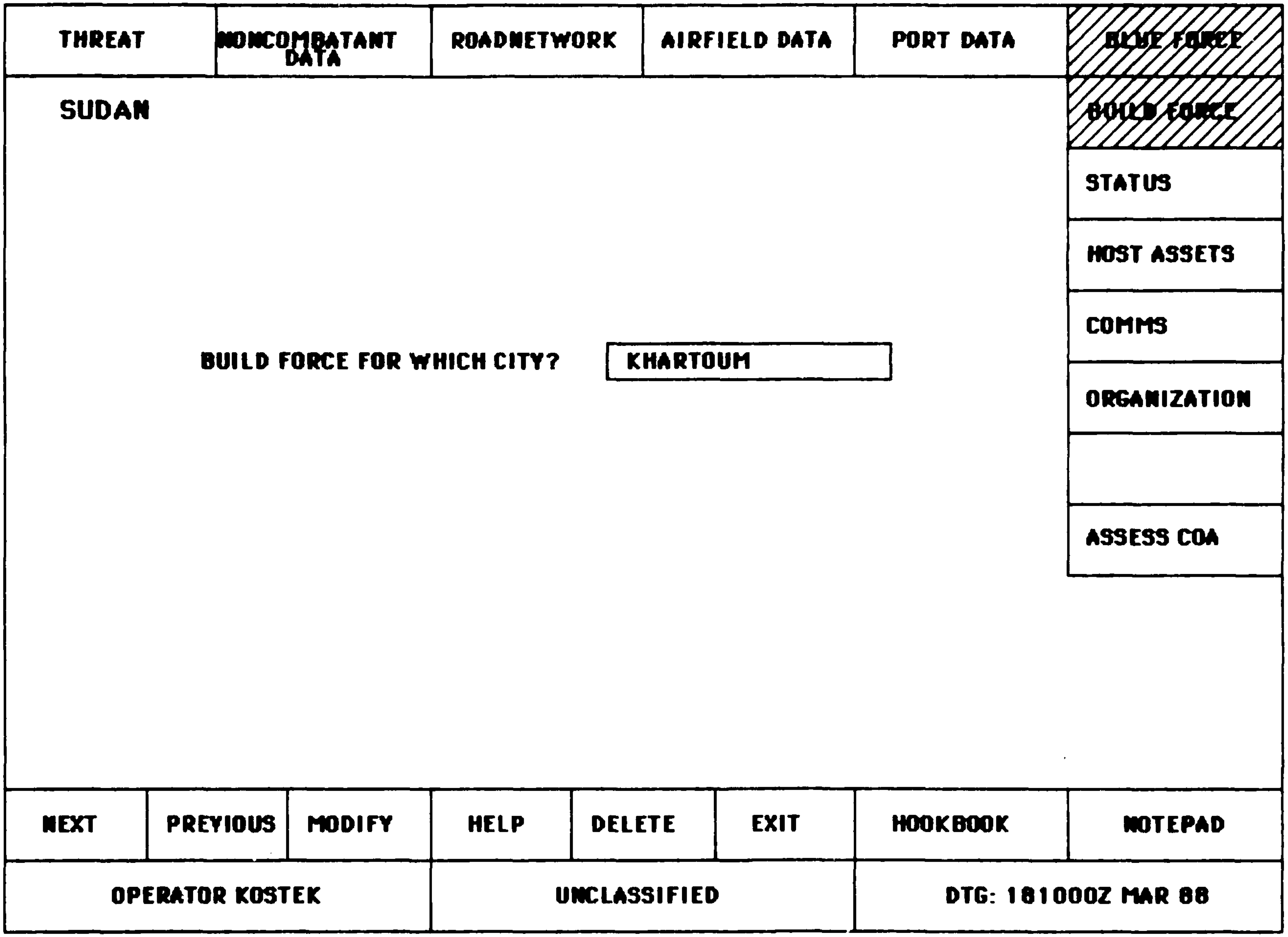

THREAT
NONCOMBATANT DATA
ROADNETWORK
AIRFIELD DATA
PORT DATA
BLUE FORCE
SUDAN
BUILD FORCE
STATUS
HOST ASSETS
COMMS
ORGANIZATION
ASSESS COA
NEXT
PREVIOUS
MODIFY
HELP
DELETE
EXIT
HOOKBOOK
NOTEPAD
OPERATOR KOSTEK
UNCLASSIFIED
DTG: 181000Z MAR 88

BLUE FORCE/BUILD FORCE

-THIS SCREEN DISPLAY ILLUSTRATES THAT THE USER HAS MOVED THE CURSOR DOWN FROM 'BLUE FORCE' TO 'BUILD FORCE'.

-IMMEDIATELY THE SUPPORT SYSTEM WILL QUERY THE USER IN REGARDS TO WHICH CITY THE FORCE BE BUILT FOR.

-THE USER TYPES IN THE NAME OF THE CITY, IN THIS CASE, KHARTOUM. THE SUPPORT SYSTEM WILL THEN ACCESS THE DATA BASE FOR DATA RELATIVE TO THAT SPECIFIC CITY.


THREAT
NONCOMBATANT DATA
ROADNETWORK
AIRFIELD DATA
PORT DATA
BLUE FORCE
SUDAN
BUILD FORCE
STATUS
HOST ASSETS
COMMS
ORGANIZATION
ASSESS COA
BUILD FORCE FOR WHICH CITY?
KHARTOUM
NEXT
PREVIOUS
MODIFY
HELP
DELETE
EXIT
HOOKBOOK
NOTEPAD
OPERATOR KOSTEK
UNCLASSIFIED
DTG: 181000Z MAR 88

BLUE FORCE/BUILD FORCE

-THE SUPPORT SYSTEM HAS A BUILT-IN STEP BY STEP PROCESS TO TAKE THE USER THROUGH THE PLANNING FACTORS INVOLVED IN BUILDING THE FORCE.

-IN THIS SCREEN DISPLAY, THE USER HAS JUST MOVED THE CURSOR TO THE 'NEXT' KEY AND THE DISPLAY SCREEN PROVIDES AN OPEN-ENDED MATRIX. IN THE FIRST OF A SERIES OF 'BUILD FORCE' MATRICES, THE FIRST ITEM WHICH IS ADDRESSED IS THE AIRFIELD WHERE THE EVACUATION WILL TAKE PLACE FROM. THIS ENTRY IS IMMEDIATELY FOLLOWED BY THREE THREAT ENVIRONMENT DESCRIPTORS. THESE ARE SEMIPERMISSIVE COURSE OF ACTION (SP COA), NONPERMISSIVE COURSE OF ACTION (NP COA), AND HOSTILE COURSE OF ACTION (HOS COA).

THREAT	NONCOMBATANT DATA	ROADNETWORK	AIRFIELD DATA	PORT DATA	BLUE FORCE

SUDAN

AIRFIELD	SP COA	NP COA	HOS COA

BUILD FORCE
STATUS
HOST ASSETS
COMMS
ORGANIZATION
ASSESS COA

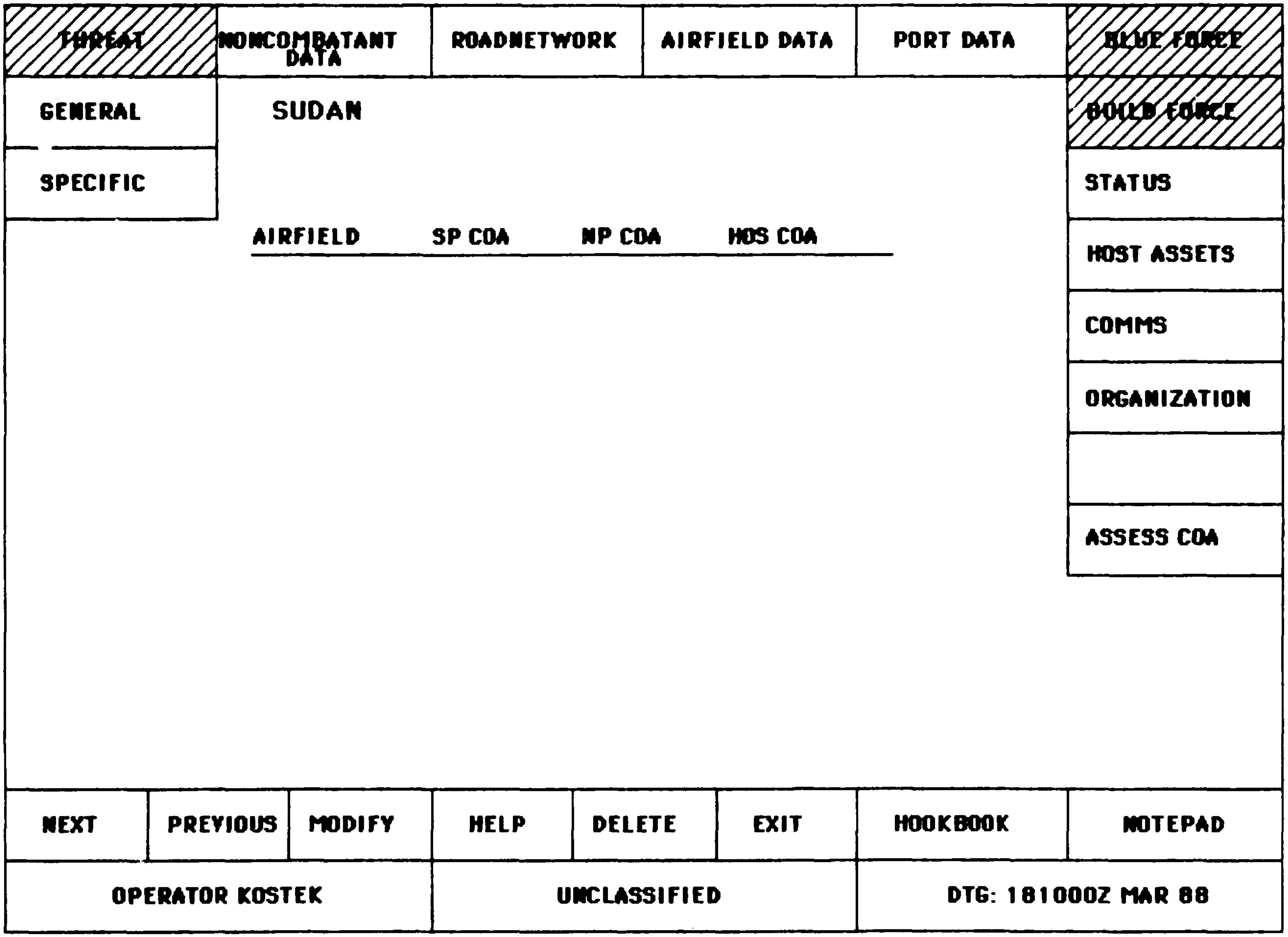
NEXT	PREVIOUS	MODIFY	HELP	DELETE	EXIT	HOOKBOOK	NOTEPAD

OPERATOR KOSTEK	UNCLASSIFIED	DTG: 181000Z MAR 88

BLUE FORCE/BUILD FORCE--THREAT

-BEFORE THE USER CAN START CONSTRUCTION OF THE FORCE, HE MUST BE AWARE OF THE THREAT AT THAT SPECIFIC LOCATION.

-CONSEQUENTLY, THIS DISPLAY SCREEN ILLUSTRATES THE FACT THAT THE USER HAS MOVED THE CURSOR TO THE 'THREAT' WINDOW AND CAUSED THE TWO WINDOWS BELOW THE 'THREAT' WINDOW TO BE DRAWN DOWN. AS BEFORE, TO INSURE THAT THE BLUE FORCE/BUILD FORCE DATA DOES NOT DISAPPEAR FROM THE SCREEN, THE USER MUST MOVE THE CURSOR TO THE 'MODIFY' KEY BEFORE HIGHLIGHTING THE THREAT WINDOW.


THREAT
NONCOMBATANT DATA
ROADNETWORK
AIRFIELD DATA
PORT DATA
BLUE FORCE
GENERAL
SUDAN
BUILD FORCE
SPECIFIC
STATUS
AIRFIELD
SP COA
NP COA
NOS COA
HOST ASSETS
COMMS
ORGANIZATION
ASSESS COA
NEXT
PREVIOUS
MODIFY
HELP
DELETE
EXIT
HOOKBOOK
NOTEPAD
OPERATOR KOSTEK
UNCLASSIFIED
DTG: 181000Z MAR 88

BLUE FORCE/BUILD FORCE--SPECIFIC THREAT

-THIS DISPLAY SCREEN ILLUSTRATES THAT THE USER HAS MOVED THE CURSOR DOWN FROM THE 'THREAT' WINDOW TO THE 'SPECIFIC' WINDOW. AS A RESULT, A SCREEN WINDOW HAS OPENED UP CALLED 'THREAT' ON THE DISPLAY SCREEN.

-THE USER MUST THEN TYPE IN THE LOCATION FOR WHICH THE SPECIFIC THREAT INFORMATION IS DESIRED. THEREFORE, THE USER TYPES IN AF1 (AIRFIELD 1). THE SUPPORT SYSTEM RESPONDS WITH THE SPECIFIC THREAT ENVIRONMENT ALONG WITH A DESCRIPTION OF ENEMY DISPOSITION, COMPOSITION, WEAPONS, AND TYPE OF ACTIVITY AT THAT LOCATION. THE USER THEN TYPES IN AF2 FOR A SPECIFIC THREAT SITUATION ALSO.

-BASED ON THE GIVEN THREAT SITUATION AT THE AIRFIELDS, THE USER MAKES A DECISION TO CHOOSE AF1 AS THE EVACUATION POINT FOR THE NEO. BASED UPON THE SPECIFIC THREAT SITUATION AND EXPERIENCE, THE USER WILL INPUT THE SPECIFIC SIZE AND TYPE FORCE NEEDED TO PROVIDE SECURITY AT THE AIRFIELD.

-THIS SCREEN DISPLAY SHOWS THAT THE USER HAS INPUT '1 MP PLT' UNDER THE MOST LIKELY OPTION, THAT IS A, A SEMIPERMISSIVE ENVIRONMENT. ADDITIONALLY, THE USER HAS DECIDED TO BUILD A SECOND OPTION, THAT IS B, IN CASE THE ENVIRONMENT DETERIORATES TO A NONPERMISSIVE ENVIRONMENT. IN THIS CASE, THE USER HAS DECIDED THAT 'I INF CO' WILL BE NEEDED.

THREAT	NONCOMBATANT DATA	ROADNETWORK	AIRFIELD DATA	PORT DATA	BLUE FORCE

GENERAL

SPECIFIC

SUDAN

AIRFIELD	SP COA	NP COA	HOS COA
AF1	A-1MP PLT	B-1INF CO	-

BUILD FORCE

STATUS

HOST ASSETS

COMMS

ORGANIZATION

ASSESS COA

THREAT

AF1 SEMIPERMISSIVE
SUDANESE TROOPS ABLE TO PROVIDE LIMITED SECURITY. *

AF2 HOSTILE
REBEL FORCES HAVE TAKEN CONTROL OF AIR-FIELD. *

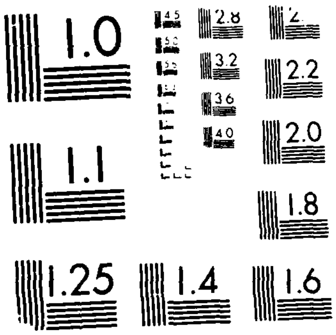
*DATA WOULD INCLUDE ENEMY DISP,COMP,WPNS, ACTIVITY.

NEXT	PREVIOUS	MODIFY	HELP	DELETE	EXIT	HOOKBOOK	NOTEPAD

OPERATOR KOSTEK	UNCLASSIFIED	DTG: 181000Z MAR 88

AD-A190 759 A USER'S DESIGN OF A DECISION SUPPORT SYSTEM FOR NONCOMBATANT EVACUATION (U) AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OH SCHOOL OF ENGI S R KOSTEK 2/2

UNCLASSIFIED MAR 88 AFIT/GST/ENS/88M-7 F/G 15/1 NL



MICROCOPY RESOLUTION TEST CHART

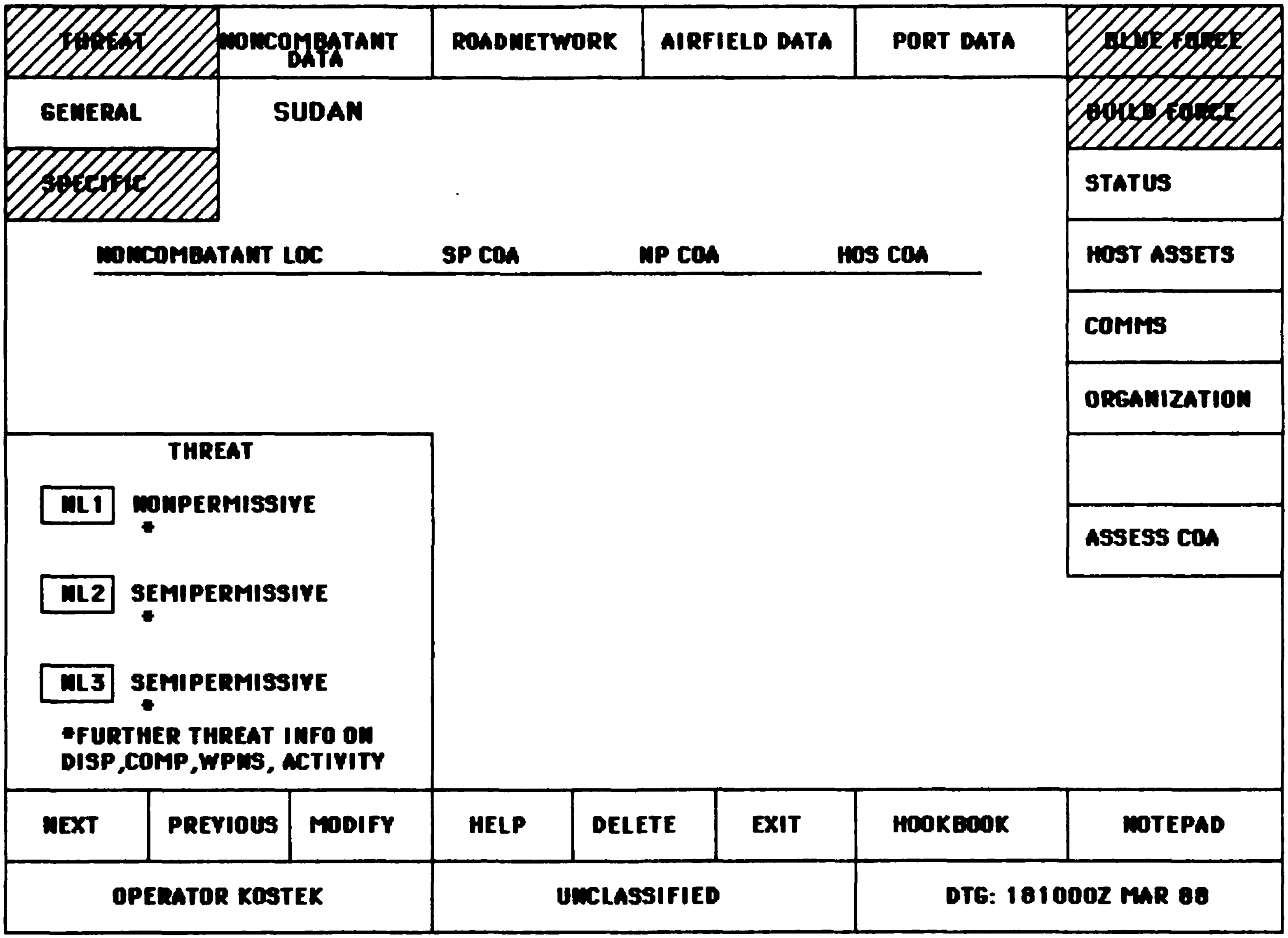
NATIONAL BUREAU [illegible] STANDARDS [illegible]

BLUE FORCE/BUILD FORCE--SPECIFIC THREAT

-ONCE THE FORCES FOR AIRFIELD SECURITY HAVE BEEN DETERMINED, THE NEXT STEP IN THE 'BUILD FORCE' PROCESS IS TO DETERMINE THE SECURITY FORCE NEEDED AT EACH NONCOMBATANT LOCATION. THIS IS DONE BY THE USER SIMPLY MOVING THE CURSOR TO THE 'NEXT' KEY.

-AS BEFORE, THE SCREEN DISPLAY SHOWS AN OPEN-ENDED MATRIX WITH NONCOMBATANT LOCATION AND THE COURSES OF ACTION ASSOCIATED WITH EACH THREAT ENVIRONMENT.

-AGAIN, THE SPECIFIC THREAT WINDOWS ARE BOTH HIGHLIGHTED AND THE USER NEEDS TO INPUT EACH SPECIFIC NONCOMBATANT LOCATION (I.E. NL1, NL2, NL3). THE SUPPORT SYSTEM WILL RESPOND WITH THE SPECIFIC THREAT ENVIRONMENT FOR THAT LOCATION ALONG WITH THE THREAT SITUATION.

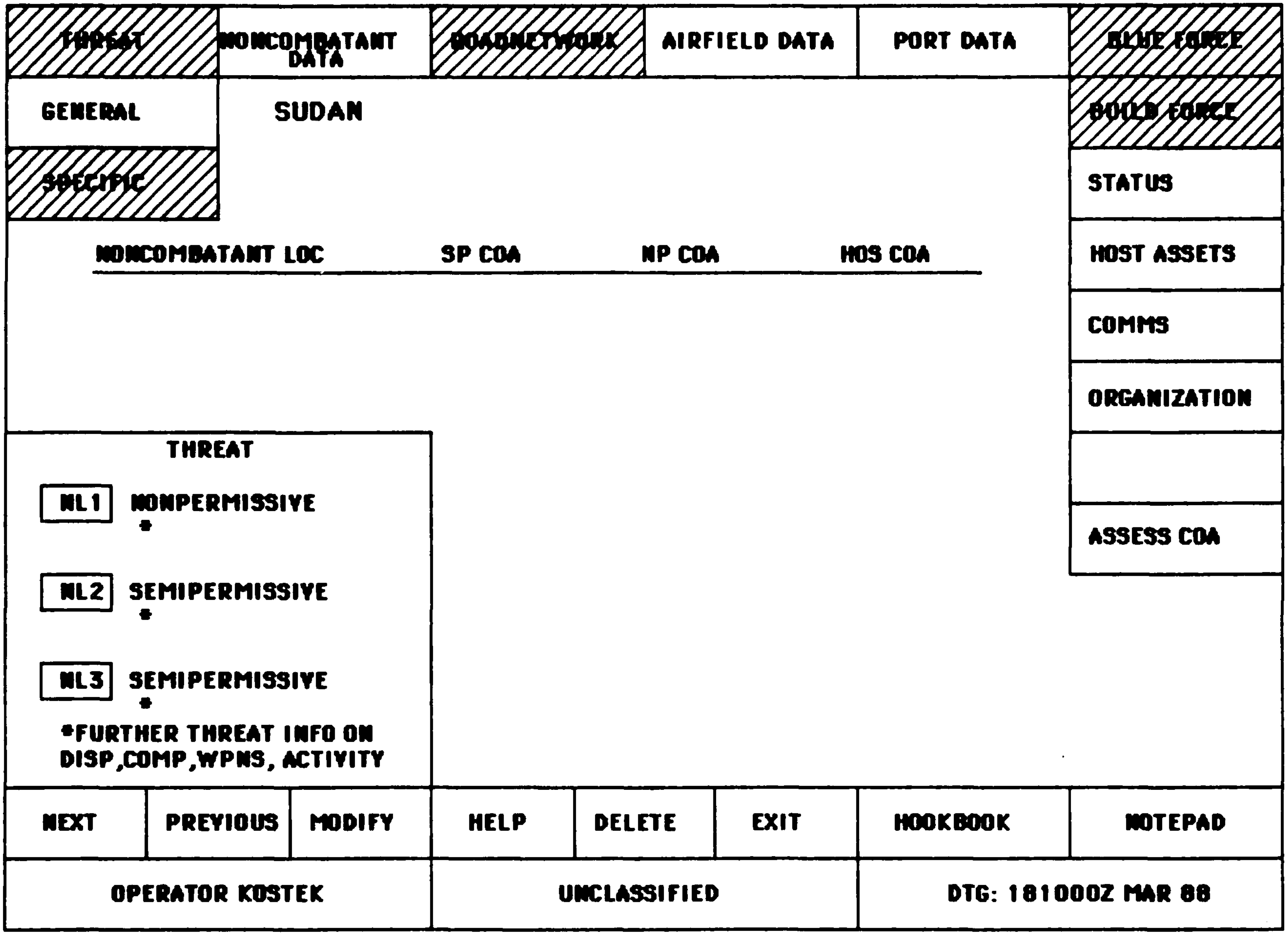


THREAT
NONCOMBATANT DATA
ROADNETWORK
AIRFIELD DATA
PORT DATA
BLUE FORCE
GENERAL
SUDAN
BUILD FORCE
SPECIFIC
STATUS
NONCOMBATANT LOC
SP COA
NP COA
HOS COA
HOST ASSETS
COMMS
ORGANIZATION
THREAT
NL1 NONPERMISSIVE *
NL2 SEMIPERMISSIVE *
NL3 SEMIPERMISSIVE *
*FURTHER THREAT INFO ON DISP,COMP,WPNS, ACTIVITY
ASSESS COA
NEXT
PREVIOUS
MODIFY
HELP
DELETE
EXIT
HOOKBOOK
NOTEPAD
OPERATOR KOSTEK
UNCLASSIFIED
DTG: 181000Z MAR 88

BLUE FORCE/BUILD FORCE--SPECIFIC THREAT--ROADNETWORK

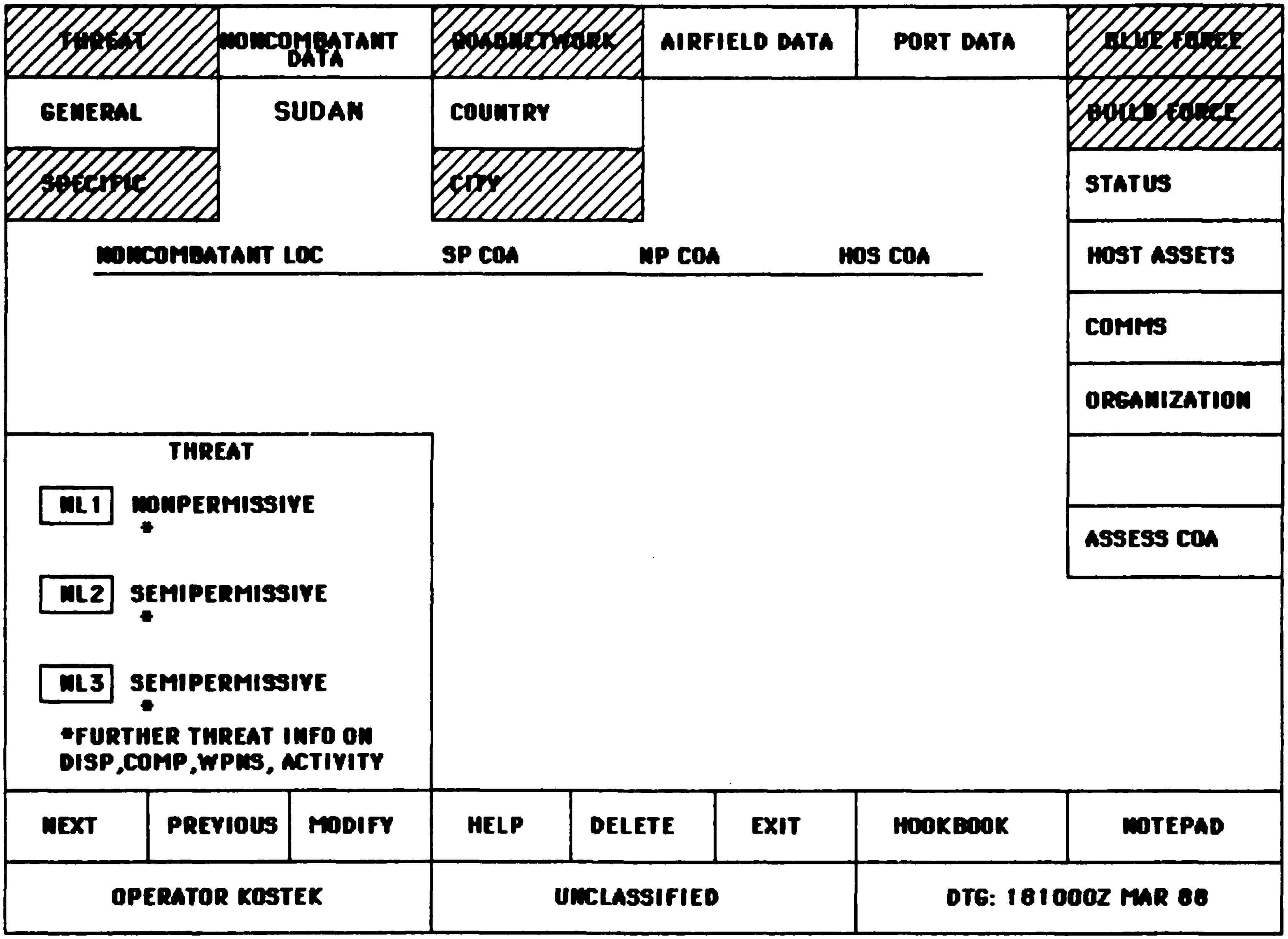
-THIS SCREEN DISPLAY ILLUSTRATES THAT THE USER WANTS TO SEE THE ROADNETWORK DATA BEFORE DECIDING ON WHICH SIZE FORCE IS NEEDED TO PERFORM THE SECURITY MISSION AT EACH OF THE NONCOMBATANT LOCATIONS.

-THE USER MUST MOVE THE CURSOR TO THE 'MODIFY' KEY PRIOR TO THE 'ROADNETWORK' WINDOW TO INSURE THAT A SEPARATE 'ROADNETWORK' SCREEN WINDOW WILL BE CREATED ALONG SIDE OF THE 'THREAT' SCREEN WINDOW.


THREAT
NONCOMBATANT DATA
ROADNETWORK
AIRFIELD DATA
PORT DATA
BLUE FORCE
GENERAL
SUDAN
BUILD FORCE
SPECIFIC
STATUS
NONCOMBATANT LOC
SP COA
NP COA
HOS COA
HOST ASSETS
COMMS
ORGANIZATION
THREAT
NL1 NONPERMISSIVE
*
NL2 SEMIPERMISSIVE
*
NL3 SEMIPERMISSIVE
*
*FURTHER THREAT INFO ON
DISP,COMP,WPNS, ACTIVITY
ASSESS COA
NEXT
PREVIOUS
MODIFY
HELP
DELETE
EXIT
HOOKBOOK
NOTEPAD
OPERATOR KOSTEK
UNCLASSIFIED
DTG: 181000Z MAR 88

BLUE FORCE/BUILD FORCE--SPECIFIC THREAT--CITY ROADNETWORK

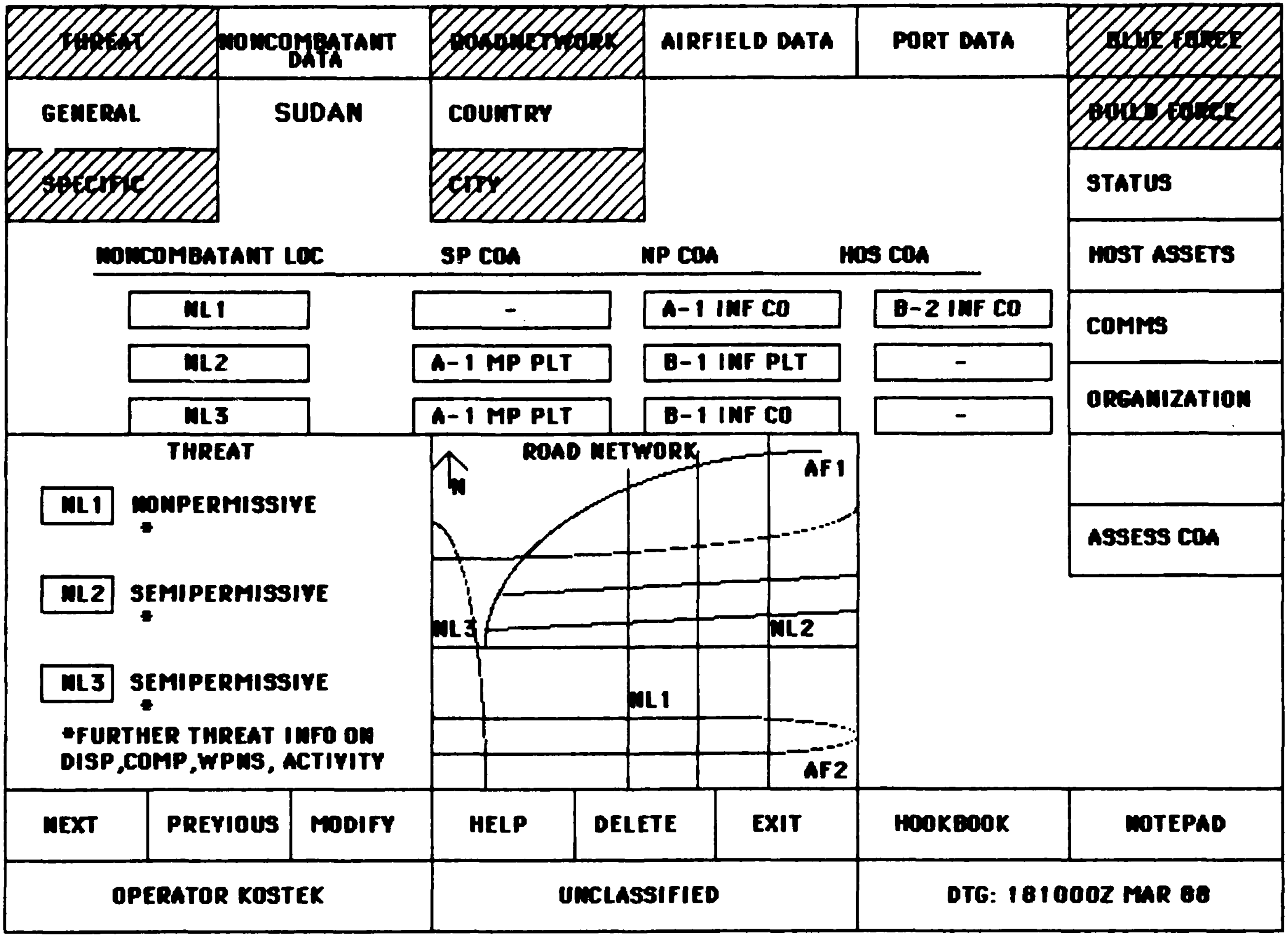
-THIS SCREEN DISPLAY SIMPLY ILLUSTRATES THE OPENING OF THE TWO SUBORDINATE WINDOWS TO THE 'ROADNETWORK' WINDOW AND THE USER MOVING THE CURSOR DOWN FROM ROADNETWORK TO CITY.


THREAT
NONCOMBATANT DATA
ROADNETWORK
AIRFIELD DATA
PORT DATA
BLUE FORCE
GENERAL
SUDAN
COUNTRY
BUILD FORCE
SPECIFIC
CITY
STATUS
NONCOMBATANT LOC
SP COA
NP COA
HOS COA
HOST ASSETS
COMMS
ORGANIZATION
THREAT
NL1 NONPERMISSIVE
*
NL2 SEMIPERMISSIVE
*
NL3 SEMIPERMISSIVE
*
*FURTHER THREAT INFO ON
DISP,COMP,WPNS, ACTIVITY
ASSESS COA
NEXT
PREVIOUS
MODIFY
HELP
DELETE
EXIT
HOOKBOOK
NOTEPAD
OPERATOR KOSTEK
UNCLASSIFIED
DTG: 181000Z MAR 88

BLUE FORCE/BUILD FORCE--SPECIFIC THREAT--CITY ROADNETWORK

-THIS SCREEN DISPLAY SHOWS THE 'KHARTOUM ROADNETWORK' SCREEN WINDOW DISPLAYED ALONGSIDE THE 'THREAT' SCREEN WINDOW.

-THE SAME PROCEDURE IS FOLLOWED BY THE USER IN SPECIFYING HIS INPUTS AS IN THE AIRFIELD SECURITY MISSION. HERE, THE USER INPUTS EACH NONCOMBATANT LOCATION ALONG WITH THE NECESSARY SECURITY FORCE NEEDED AT THAT SPECIFIC LOCATION TO INSURE A SAFE EVACUATION. AS BEFORE, THE LETTER 'A' PRECEDING THE SIZE AND TYPE FORCE IS BASED ON THE PRIMARY PRESENT THREAT ENVIRONMENT AT THAT LOCATION. THE LETTER 'B' MEANS AN ALTERNATE COURSE OF ACTION BASED ON A DETERIORATION OF THAT THREAT ENVIRONMENT AT THAT SPECIFIC LOCATION.

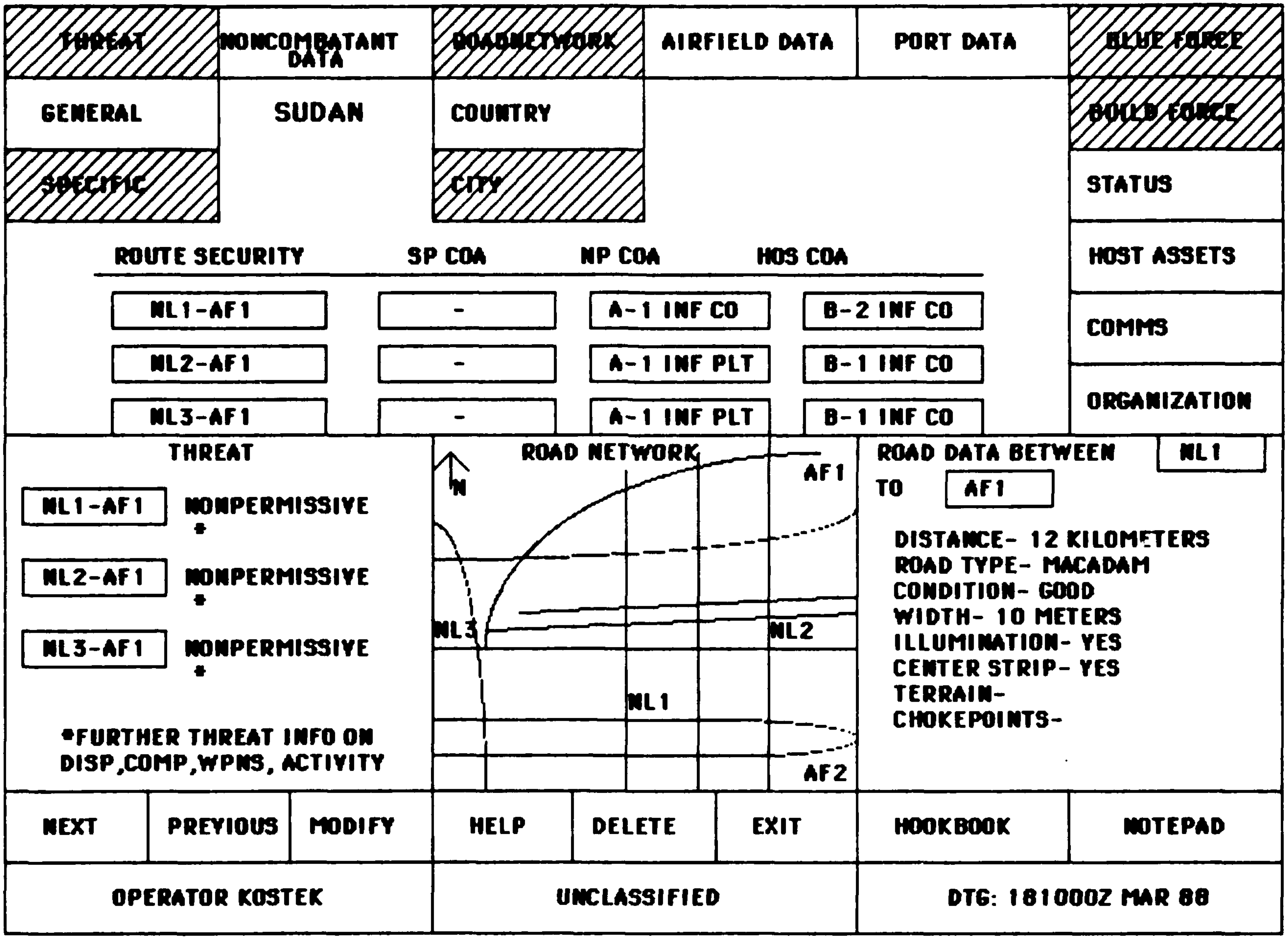

THREAT
NONCOMBATANT DATA
ROADNETWORK
AIRFIELD DATA
PORT DATA
BLUE FORCE
GENERAL
SUDAN
COUNTRY
BUILD FORCE
SPECIFIC
CITY
STATUS
NONCOMBATANT LOC
SP COA
NP COA
HOS COA
HOST ASSETS
NL1
-
A-1 INF CO
B-2 INF CO
COMMS
NL2
A-1 MP PLT
B-1 INF PLT
-
ORGANIZATION
NL3
A-1 MP PLT
B-1 INF CO
-
THREAT
ROAD NETWORK
N
AF1
ASSESS COA
NL1 NONPERMISSIVE
*
NL2 SEMIPERMISSIVE
*
NL3
NL2
NL3 SEMIPERMISSIVE
*
NL1
*FURTHER THREAT INFO ON
DISP,COMP,WPNS, ACTIVITY
AF2
NEXT
PREVIOUS
MODIFY
HELP
DELETE
EXIT
HOOKBOOK
NOTEPAD
OPERATOR KOSTEK
UNCLASSIFIED
DTG: 181000Z MAR 88

BLUE FORCE/BUILD FORCE--SPECIFIC THREAT-- CITY ROADNETWORK

-ONCE THE FORCES FOR EACH NONCOMBATANT LOCATION HAVE BEEN DETERMINED, THE NEXT STEP IN THE 'BUILD FORCE' PROCESS IS TO DETERMINE THE SECURITY FORCE NEEDED ALONG EACH ROUTE FROM THE SPECIFIC NONCOMBATANT LOCATION TO THE AIRFIELD EVACUATION POINT.

-THE USER HAS DECIDED HE NEEDS THE THREAT ENVIRONMENT AND SITUATION ALONG EACH ROUTE AND INPUTS THAT INFORMATION (E.G. NL1-AF1, NL2-AF1, NL3-AF1). THE USER HAS ALSO DECIDED THAT MORE SPECIFIC INFORMATION IS NEEDED FOR EACH ROUTE, IN THIS CASE, THE SPECIFIC ROAD DATA. A SEPARATE 'ROAD DATA' SCREEN WINDOW IS CREATED USING THE 'MODIFY' KEY AND MOVING THE CURSOR TO THE 'CITY' WINDOW AGAIN.

-NOW, THE SAME PROCEDURE AS DISCUSSED IN EARLIER DISPLAYS IS FOLLOWED BY THE USER IN WRITING IN THE INPUTS NEEDED IN THE ROUTE SECURITY MATRIX.


THREAT
NONCOMBATANT DATA
ROADNETWORK
AIRFIELD DATA
PORT DATA
BLUE FORCE
GENERAL
SUDAN
COUNTRY
BUILD FORCE
SPECIFIC
CITY
STATUS
ROUTE SECURITY
SP COA
NP COA
HOS COA
HOST ASSETS
NL1-AF1
-
A-1 INF CO
B-2 INF CO
COMMS
NL2-AF1
-
A-1 INF PLT
B-1 INF CO
NL3-AF1
-
A-1 INF PLT
B-1 INF CO
ORGANIZATION
THREAT
ROAD NETWORK
ROAD DATA BETWEEN
NL1
TO
AF1
N
AF1
NL1-AF1
NONPERMISSIVE
*
NL2-AF1
NONPERMISSIVE
*
NL3-AF1
NONPERMISSIVE
*
NL3
NL2
NL1
AF2
DISTANCE- 12 KILOMETERS
ROAD TYPE- MACADAM
CONDITION- GOOD
WIDTH- 10 METERS
ILLUMINATION- YES
CENTER STRIP- YES
TERRAIN-
CHOKEPOINTS-
*FURTHER THREAT INFO ON
DISP,COMP,WPNS, ACTIVITY
NEXT
PREVIOUS
MODIFY
HELP
DELETE
EXIT
HOOKBOOK
NOTEPAD
OPERATOR KOSTEK
UNCLASSIFIED
DTG: 181000Z MAR 88

BLUE FORCE/BUILD FORCE

-THE SCREEN DISPLAY SHOWN HERE IS THE RESULT OF THE USER MOVING THE CURSOR TO THE NEXT KEY ESTABLISHED IN THE STEP BY STEP BUILD FORCE PROCESS.

-THIS DISPLAY IS MERELY A CONSOLIDATION OF THE EARLIER INPUTS MADE BY THE USER IN THE EARLIER BUILD FORCE DISPLAYS. THE BOTTOM LINE PROVIDES A SYNOPSIS OF THOSE FORCES NEEDED FOR EACH COURSE OF ACTION.

THREAT	NONCOMBATANT DATA	ROADNETWORK	AIRFIELD DATA	PORT DATA	BLUE FORCE

SUDAN

BUILD FORCE

STATUS

HOST ASSETS

COMMS

ORGANIZATION

ASSESS COA

FORCE SIZE AND TYPE BASED ON SPECIFIC THREAT ENVIRONMENT

SECURITY ACTION	ENVIRONMENT- FORCE SIZE AND TYPE	
EVACUATION POINT AF1	A-SP 1 MP PLT	B -NP 1 INF CO
NONCOMBATANT LOCATION		
NL1	NP 1 INF CO	HOS 2 INF CO
NL2	SP 1 MP PLT	NP 1 INF PLT
NL3	SP 1 MP PLT	NP 1 INF CO
ROUTE SECURITY		
NL1-AF1	NP 1 INF CO	HOS 2 INF CO
NL2-AF1	NP 1 INF PLT	HOS 1 INF CO
NL3-AF1	NP 1 INF PLT	HOS 1 INF CO

A- 2 INF CO
3 MP PLT
2 INF PLT

B- 8 INF CO
1 INF PLT

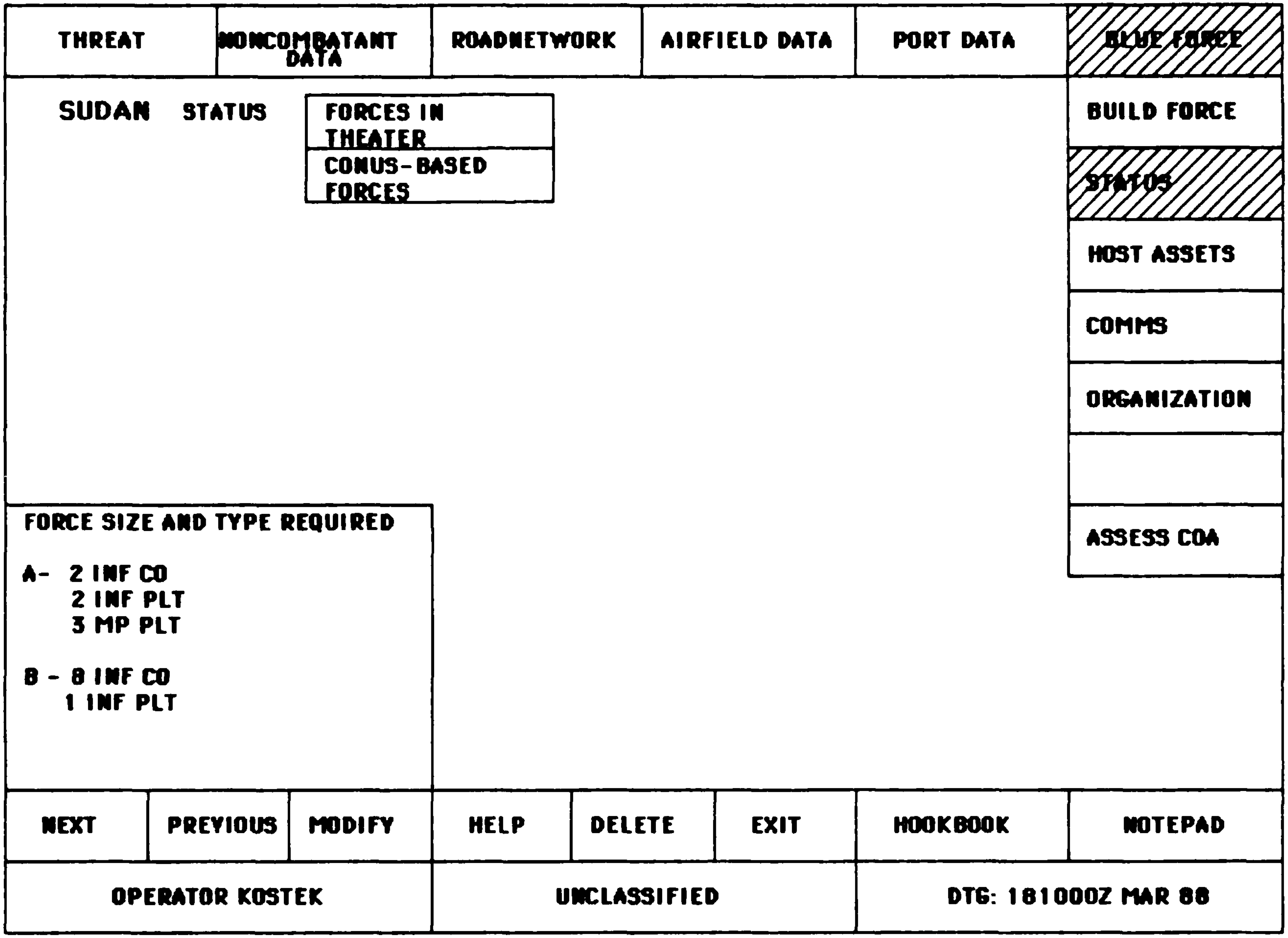
NEXT	PREVIOUS	MODIFY	HELP	DELETE	EXIT	HOOKBOOK	NOTEPAD

OPERATOR KOSTEK	UNCLASSIFIED	DTG: 181000Z MAR 88

BLUE FORCE/STATUS

-ONCE THE FORCE SIZE AND TYPE REQUIRED HAVE BEEN DETERMINED, THIS INFORMATION IS CARRIED OVER IN A SEPARATE SCREEN WINDOW FOR BOTH THE 'STATUS' AND 'ORGANIZATION' WINDOWS.

-THE USER HAS MOVED THE CURSOR DOWN FROM THE 'BLUE FORCE' WINDOW TO THE 'STATUS' WINDOW. THE SUPPORT SYSTEM RESPONDS BY CREATING TWO SEPARATE SUBWINDOWS OF THE 'STATUS' WINDOW WHICH ARE THE 'FORCES IN THEATER' WINDOW AND THE 'CONUS BASED FORCES' WINDOW.


THREAT
NONCOMBATANT DATA
ROADNETWORK
AIRFIELD DATA
PORT DATA
BLUE FORCE
SUDAN STATUS
FORCES IN THEATER
CONUS-BASED FORCES
BUILD FORCE
STATUS
HOST ASSETS
COMMS
ORGANIZATION
ASSESS COA
FORCE SIZE AND TYPE REQUIRED
A- 2 INF CO
2 INF PLT
3 MP PLT
B - 8 INF CO
1 INF PLT
NEXT
PREVIOUS
MODIFY
HELP
DELETE
EXIT
HOOKBOOK
NOTEPAD
OPERATOR KOSTEK
UNCLASSIFIED
DTG: 181000Z MAR 88

BLUE FORCE/STATUS--FORCES IN THEATER

-THIS SCREEN DISPLAY SHOWS THAT THE USER HAS MOVED THE CURSOR TO THE 'FORCES IN THEATER WINDOW. CONSEQUENTLY, THE PRESENT INFORMATION ABOUT FORCES AVAILABLE IN THEATER WITH CLOSURE TIMES ARE DISPLAYED FOR THE USER.

THREAT | NONCOMBATANT DATA | ROADNETWORK | AIRFIELD DATA | PORT DATA | BLUE FORCE

SUDAN STATUS

FORCES IN THEATER
CONUS-BASED FORCES

SERVICE	UNIT	LOCATION	STATUS	CLOSURE TIME
ARMY	NONE	-	-	-
MARINES	1ST MAU	DIEGO GARCIA	AVAIL	18 HOURS

BUILD FORCE
STATUS
HOST ASSETS
COMMS
ORGANIZATION
ASSESS COA

FORCE SIZE AND TYPE REQUIRED

A- 2 INF CO
2 INF PLT
3 MP PLT

B - 8 INF CO
1 INF PLT

NEXT | PREVIOUS | MODIFY | HELP | DELETE | EXIT | HOOKBOOK | NOTEPAD

OPERATOR KOSTEK | UNCLASSIFIED | DTG: 181000Z MAR 88

BLUE FORCE/STATUS--CONUS BASED FORCES

-THIS SCREEN DISPLAY, LIKE THE PREVIOUS ONE, SHOWS THAT THE USER HAS MOVED THE CURSOR TO THE 'CONUS BASED FORCES' WINDOW. AGAIN, THE AVAILABILITY AND CLOSURE TIMES OF CONUS BASED FORCES ARE DISPLAYED FOR THE USER.

THREAT | NONCOMBATANT DATA | ROADNETWORK | AIRFIELD DATA | PORT DATA | BLUE FORCE

SUDAN STATUS

FORCES IN THEATER

CONUS-BASED FORCES

SERVICE	UNIT	LOCATION	STATUS	CLOSURE TIME
ARMY	1 RGR BN	FT STEWART,GA	AVAIL	18 HOURS
	2 RGR BN	FT BENNING,GA	NOT AVAIL	-
	3 RGR BN	FT LEWIS,WA	AVAIL	18 HOURS
	82 ABN DIV	FT BRAGG,NC	1BDE AVAIL	24 HOURS
			2BDE AVAIL	36 HOURS
MARINE	2 MAR DIV	CP LEJEUNE,SC	1 BN AVAIL	16 HOURS
			DIV(-)	24 HOURS

BUILD FORCE

STATUS

HOST ASSETS

COMMS

ORGANIZATION

ASSESS COA

FORCE SIZE AND TYPE REQUIRED

A- 2 INF CO
2 INF PLT
3 MP PLT

B - 8 INF CO
1 INF PLT

NEXT | PREVIOUS | MODIFY | HELP | DELETE | EXIT | HOOKBOOK | NOTEPAD

OPERATOR KOSTEK | UNCLASSIFIED | DTG: 181000Z MAR 88

BLUE FORCE/ORGANIZATION

-THIS SCREEN DISPLAY SHOWS THAT THE USER HAS NOW MOVED THE CURSOR TO THE 'ORGANIZATION' WINDOW.

-THE SUPPORT SYSTEM RESPONDS BY REQUESTING THE USER TO SPECIFY FOR WHICH UNIT ORGANIZATION INFORMATION IS DESIRED.

THREAT	NONCOMBATANT DATA	ROADNETWORK	AIRFIELD DATA	PORT DATA	BLUE FORCE

SUDAN

SPECIFY UNIT - 82 ABN DIV

BUILD FORCE
STATUS
HOST ASSETS
COMMS
ORGANIZATION
ASSESS COA

FORCE SIZE AND TYPE REQUIRED

A- 2 INF CO
2 INF PLT
3 MP PLT

B - 8 INF CO
1 INF PLT

NEXT	PREVIOUS	MODIFY	HELP	DELETE	EXIT	HOOKBOOK	NOTEPAD

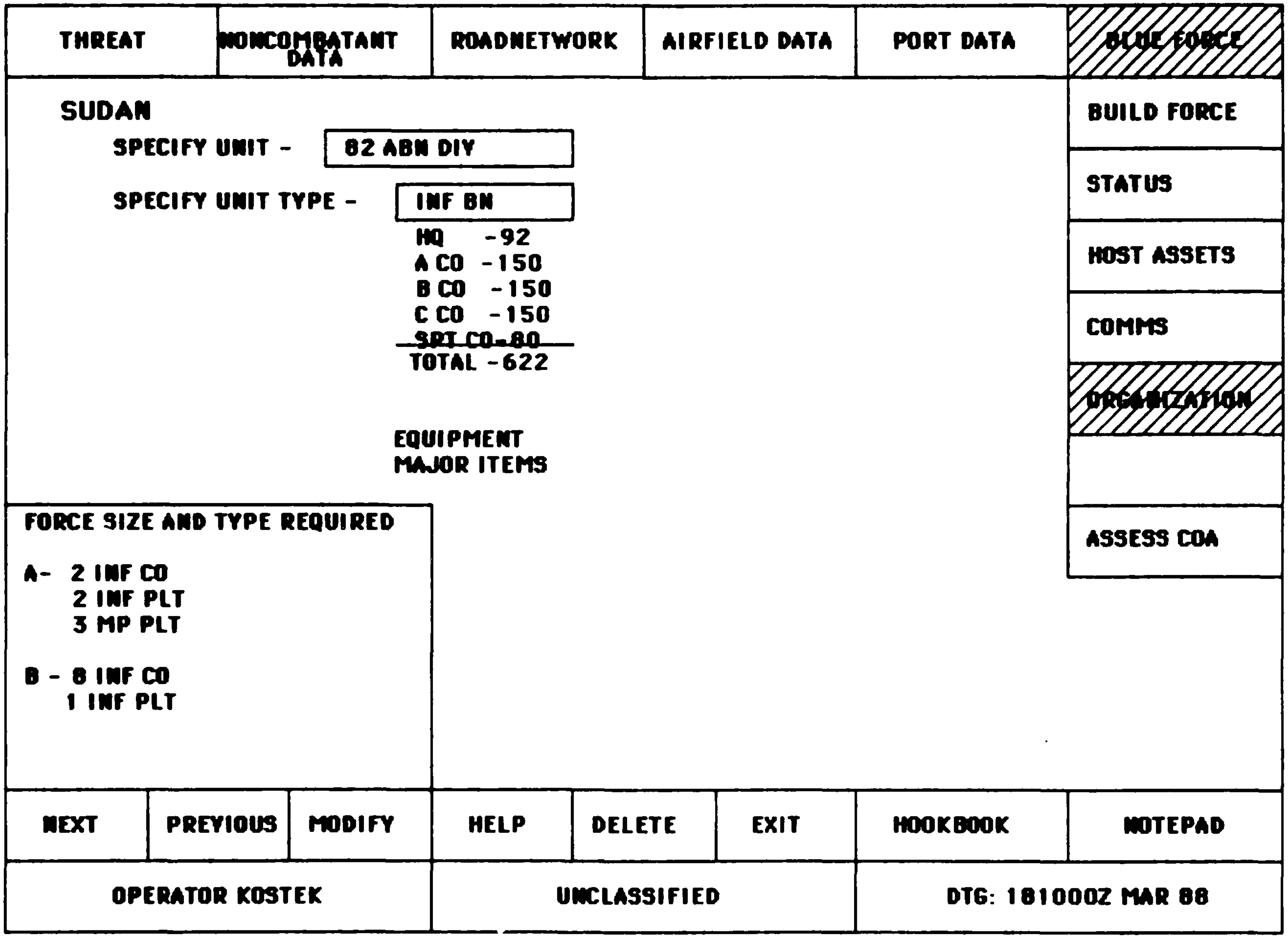
OPERATOR KOSTEK	UNCLASSIFIED	DTG: 181000Z MAR 88

BLUE FORCE/ORGANIZATION

-ONCE THE USER HAS SPECIFIED THE UNIT, THE SUPPORT SYSTEM REQUESTS THE USER TO SPECIFY THE GENERIC UNIT SIZE AND TYPE.

-IN THIS DISPLAY, THE USER HAS SPECIFIED AN INFANTRY BATTALION (INF BN).

-THE SUPPORT SYSTEM RESPONDS BY GENERATING A TYPICAL BATTLE ROSTERING OF THAT UNIT FOR A NEO MISSION. ADDITIONALLY, THOSE MAJOR ITEMS OF EQUIPMENT WILL BE NOTED SO THAT IT IS TAKEN INTO AIRLIFT REQUIREMENTS CONSIDERATION BY THE AIRLIFT PLANNERS.


THREAT
NONCOMBATANT DATA
ROADNETWORK
AIRFIELD DATA
PORT DATA
BLUE FORCE
SUDAN
SPECIFY UNIT - 82 ABN DIV
SPECIFY UNIT TYPE - INF BN
HQ -92
A CO -150
B CO -150
C CO -150
SPT CO-80
TOTAL -622
EQUIPMENT
MAJOR ITEMS
BUILD FORCE
STATUS
HOST ASSETS
COMMS
ORGANIZATION
ASSESS COA
FORCE SIZE AND TYPE REQUIRED
A- 2 INF CO
2 INF PLT
3 MP PLT
B - 8 INF CO
1 INF PLT
NEXT
PREVIOUS
MODIFY
HELP
DELETE
EXIT
HOOKBOOK
NOTEPAD
OPERATOR KOSTEK
UNCLASSIFIED
DTG: 181000Z MAR 88

BLUE FORCE/ORGANIZATION

-THIS SCREEN DISPLAY IS JUST AN ADD-ON TO THE PREVIOUS SCREEN DISPLAY, WHERE THE USER HAS SPECIFIED THE NEED TO KNOW THE ORGANIZATION OF A MILITARY POLICE PLATOON (MP PLT).

-AGAIN, THE SUPPORT SYSTEM RESPONDS BY GENERATING THE BATTLE ROSTERING WITH MAJOR ITEMS OF EQUIPMENT FOR A MP PLT IN THE 82D AIRBORNE DIVISION.

THREAT	NONCOMBATANT DATA	ROADNETWORK	AIRFIELD DATA	PORT DATA	BLUE FORCE

SUDAN

SPECIFY UNIT - 82 ABN DIV

SPECIFY UNIT TYPE - INF BN

HQ -92
A CO -150
B CO -150
C CO -150
SPT CO -80
TOTAL -622

EQUIPMENT
MAJOR ITEMS

MP CO

HQ - 4
1 PLT -40
2 PLT -40
3 PLT -40
TOTAL -124

EQUIPMENT
MAJOR ITEMS

BUILD FORCE
STATUS
HOST ASSETS
COMMS
ORGANIZATION
ASSESS COA

FORCE SIZE AND TYPE REQUIRED

A- 2 INF CO
2 INF PLT
3 MP PLT

B - 8 INF CO
1 INF PLT

NEXT	PREVIOUS	MODIFY	HELP	DELETE	EXIT	HOOKBOOK	NOTEPAD

OPERATOR KOSTEK	UNCLASSIFIED	DTG: 181000Z MAR 88

BLUE FORCE/ORGANIZATION

-BY USING THE 'MODIFY' KEY, THE USER HAS CREATED A SEPARATE SCREEN WINDOW WHICH CARRIES FORTH THE RESULTS OF THE PREVIOUS SCREEN DISPLAY.

-THE USER AGAIN MOVES THE CURSOR TO THE 'ORGANIZATION' WINDOW TO WHICH THE SUPPORT SYSTEM RESPONDS WITH A REQUIREMENT FOR THE USER TO SPECIFY THE UNIT.

-IN THIS CASE, THE USER HAS DECIDED TO USE ELEMENTS OF THE 82D ABN DIV AND NOW WANTS TO CREATE THE NECESSARY TASK ORGANIZATION OF THE FORCE REQUIRED FOR EACH COUSE OF ACTION THEREFORE, THE USER INPUTS THE WORD 'CREATE'.

THREAT	NONCOMBATANT DATA	ROADNETWORK	AIRFIELD DATA	PORT DATA	BLUE FORCE

SUDAN

SPECIFY UNIT - CREATE

BUILD FORCE

STATUS

HOST ASSETS

COMMS

ORGANIZATION

ASSESS COA

FORCE SIZE AND TYPE REQUIRED

A- 2 INF CO
2 INF PLT
3 MP PLT

B - 8 INF CO
1 INF PLT

INF BN
HQ -92
A CO -150
B CO -150
C CO -150
SPT CO-80
TOTAL -622

EQUIPMENT
MAJOR ITEMS

MP CO
HQ -4
1 PLT -40
2 PLT -40
3 PLT -40
TOTAL -124

EQUIPMENT
MAJOR ITEMS

NEXT	PREVIOUS	MODIFY	HELP	DELETE	EXIT	HOOKBOOK	NOTEPAD

OPERATOR KOSTEK	UNCLASSIFIED	DTG: 181000Z MAR 88

BLUE FORCE/ORGANIZATION

-THE SUPPORT SYSTEM RESPONDS SIMPLY WITH THE LABEL OF 'TASK ORGANIZATION'.

-BASED UPON THE TWO SCREEN WINDOWS AT THE BOTTOM OF THE SCREEN, THE USER INPUTS THE FORCE REQUIRED WITH NUMBERS OF PERSONNEL FOR COURSE OF ACTION A.

THREAT	NONCOMBATANT DATA	ROADNETWORK	AIRFIELD DATA	PORT DATA	BLUE FORCE

SUDAN

SPECIFY UNIT - CREATE

TASK ORGANIZATION

COA A

2 INF CO -300
2 INF PLT -100
3 MP PLT -124
HQ INF BN - 92
TOTAL -616

BUILD FORCE
STATUS
HOST ASSETS
COMMS
ORGANIZATION
ASSESS COA

FORCE SIZE AND TYPE REQUIRED

A- 2 INF CO
2 INF PLT
3 MP PLT

B - 8 INF CO
1 INF PLT

INF BN
HQ -92
A CO -150
B CO -150
C CO -150
SPT CO-80
TOTAL -622

EQUIPMENT
MAJOR ITEMS

MP CO
HQ -4
1 PLT -40
2 PLT -40
3 PLT -40
TOTAL -124

EQUIPMENT
MAJOR ITEMS

NEXT	PREVIOUS	MODIFY	HELP	DELETE	EXIT	HOOKBOOK	NOTEPAD

OPERATOR KOSTEK	UNCLASSIFIED	DTG: 181000Z MAR 88

BLUE FORCE/ORGANIZATION

-THIS SCREEN DISPLAY IS SIMPLY A CONTINUATION OF THE PREVIOUS DISPLAY WHERE THE USER INPUTS THE FORCE REQUIRED WITH NUMBERS OF PERSONNEL FOR COURSE OF ACTION B.

THREAT | NONCOMBATANT DATA | ROADNETWORK | AIRFIELD DATA | PORT DATA | BLUE FORCE

SUDAN

SPECIFY UNIT - CREATE

TASK ORGANIZATION

COA B

8 INF CO -1200

1 INF PLT - 50

HQ INF BN - 92

TOTAL -1342

BUILD FORCE

STATUS

HOST ASSETS

COMMS

ORGANIZATION

ASSESS COA

FORCE SIZE AND TYPE REQUIRED

A- 2 INF CO
2 INF PLT
3 MP PLT

B - 8 INF CO
1 INF PLT

INF BN
HQ -92
A CO -150
B CO -150
C CO -150
SPT CO-80
TOTAL -622

EQUIPMENT
MAJOR ITEMS

MP CO
HQ -4
1 PLT -40
2 PLT -40
3 PLT -40
TOTAL -124

EQUIPMENT
MAJOR ITEMS

NEXT | PREVIOUS | MODIFY | HELP | DELETE | EXIT | HOOKBOOK | NOTEPAD

OPERATOR KOSTEK | UNCLASSIFIED | DTG: 181000Z MAR 88

BLUE FORCE/HOST ASSETS

-THIS SCREEN DISPLAY SHOWS THAT THE USER HAS MOVED THE CURSOR TO THE 'HOST ASSETS' WINDOW.

-INFORMATION IS IMMEDIATELY PROVIDED BACK TO THE USER ON THE STATUS OF VARIOUS CATEGORIES OF TRANSPORTATION ASSETS AVAILABLE FOR THE MOVEMENT OF NONCOMBATANTS IN THE HOST COUNTRY.

THREAT	NONCOMBATANT DATA	ROADNETWORK	AIRFIELD DATA	PORT DATA	BLUE FORCE

SUDAN

HOST COUNTRY ASSETS AVAILABLE FOR MOVEMENT OF NONCOMBATANTS:

POV STATUS:

EMBASSY VEHICLE STATUS:

LOCALLY PROCURED TRANSPORTATION:

BUILD FORCE

STATUS

HOST ASSETS

COMMS

ORGANIZATION

ASSESS COA

NEXT	PREVIOUS	MODIFY	HELP	DELETE	EXIT	HOOKBOOK	NOTEPAD

OPERATOR KOSTEK	UNCLASSIFIED	DTG: 181000Z MAR 88

BLUE FORCE/COMMS

-THIS SCREEN DISPLAY SHOWS THAT THE USER HAS NOW MOVED THE CURSOR TO THE 'COMMS' WINDOW.

-INFORMATION IS IMMEDIATELY PROVIDED BACK TO THE USER ON THE STATUS OF COMMUNICATIONS ASSETS IN COUNTRY AND SPECIFIC OPERATING PROCEDURES.

THREAT	NONCOMBATANT DATA	ROADNETWORK	AIRFIELD DATA	PORT DATA	BLUE FORCE

SUDAN

COMMUNICATIONS STATUS

TYPE OF COMMUNICATIONS AT EMBASSY:

COMMUNICATIONS LINKS BETWEEN EMBASSY AND OTHER NONCOMBATANT LOCATIONS:

RADIO FREQUENCIES, IF APPLICABLE:

PROCEDURES FOR ARRIVING FORCES TO COMMUNICATE WITH NONCOMBATANTS:

BUILD FORCE | STATUS | HOST ASSETS | COMMS | ORGANIZATION | | ASSESS COA

NEXT	PREVIOUS	MODIFY	HELP	DELETE	EXIT	HOOKBOOK	NOTEPAD

OPERATOR KOSTEK	UNCLASSIFIED	DTG: 181000Z MAR 88

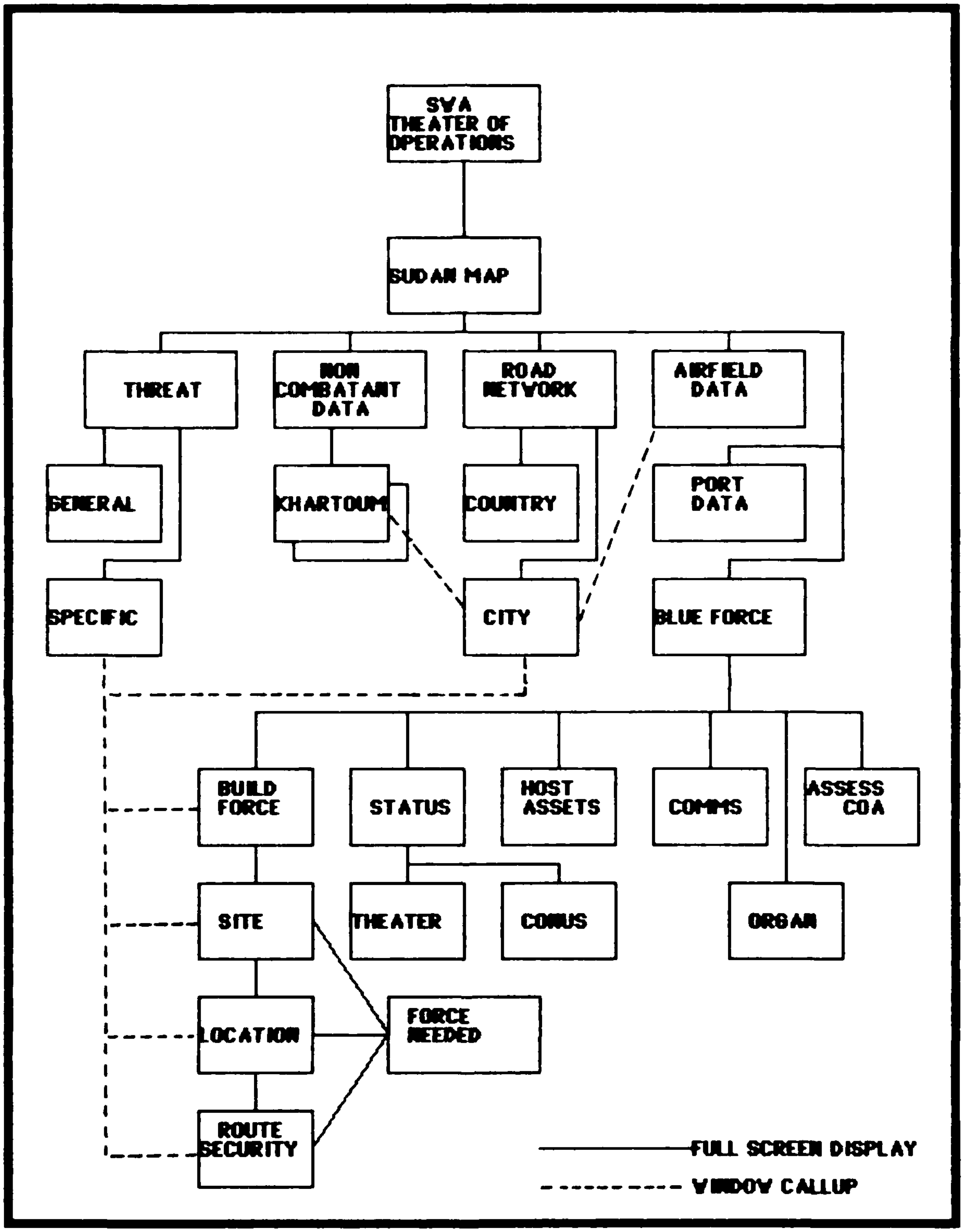


Figure 9 - NEO DSS Feature Chart

APPENDIX B SOTACA

This appendix contains a description of the State of the Art contingency Analysis (SOTACA) model and how it may be applied as an evaluation mechanism in assessing various courses of action in a Noncombatant Evacuation Operations plan. More specifically, SOTACA can be used to verify the size and type of the military force previously determined by the NEO planner. The sources of information for this appendix are the "SOTACA User's Manual" dated April 1987 and "A SOTACA-Based Methodology Assessing the Impact of Mobility Enhancements on Civil-Military Operations", a study prepared by the U.S. Pacific Command, dated 6 January 1988.

One of the principal conclusions drawn from Chapter Four of this thesis was the recognition and need for some type of course of action assessment system. The decision as to which size and type of military force needed to insure the security of the noncombatants was one that was very subjective on the part of the Noncombatant Evacuation Operations (NEO) planner and dependent on time, distance, and threat factors. It was quite evident that some type of wargaming model was needed which could simulate the particular host country environment to include the threat and provide some type of feedback to the planner relative to the size and type of military force selected to perform the NEO mission. Additionally, the simulation had to be responsive to the planner since time was such a critical factor. As a result of this conclusion, a recommendation was made to incorporate the State of the Art Contingency Analysis (SOTACA) model into the Decision Support System (DSS) which supported NEO planning.

SOTACA is a computer based, analytical model designed to support crisis action planning. Developed under the JCS sponsored Modern Aids to Planning Program (MAPP), SOTACA will eventually support a future phase of the Joint Operational Planning and Execution System (JOPES). SOTACA was specifically designed to support planning at the joint/unified command level by providing a means for rapid evaluation of alternative courses of action (SOTACA User's

Manual, 1987: iii). "SOTACA addresses the firepower, maneuver, and time and space considerations addressed by other models. Unlike other models, however, SOTACA aims for a realistic representation of the multidimensional conflict usually found in Third World contingency situations. These situations typically involve a more varied mix of force components than other contingency situations and require a greater consideration of political, economic, social, and psychological factors" (SOTACA Handbook, 1987: 1-3). Because of SOTACA's flexibility in its approach to power and vulnerability values, it appears to be an excellent model to assess NEO alternative courses of action, in this case, the NEO planner's subjective determination of the size and type of the military security force.

1. SOTACA Definition of Terms. Prior to a discussion of how SOTACA can be used to evaluate NEO alternative courses of action, it will be necessary to explain some terms, common to the running of SOTACA, particularly as they apply to the NEO environment.

a. BLUE Forces: Friendly forces, those U.S. forces identified to insure the security of U.S. noncombatants during the evacuation process.

b. RED Forces: Enemy forces, those forces opposed to the safe evacuation of U.S. noncombatants. These

forces may include national military forces, paramilitary forces, local government forces, local and national police, and the civil populace.

c. Task Force: A subset of the total force assigned to accomplish a specific task. In the NEO environment, the friendly force is no smaller than platoon size and will be used for airfield/port security, site security at each noncombatant location, and route security between the noncombatant location to the evacuation site airfield or port.

d. Confrontation: The engagement of opposing task forces. In SOTACA, confrontation can only take place at nodes within the network and not along routes or links. This will be discussed in more detail later.

e. Power: The attribute of one force that influences the opposing force. For the NEO environment, there are two types of power which can be represented. These two types of power are military and political power. "Military power acts on the military and paramilitary units of the opposing force. Political power acts on the civil populace. Two types of political power are represented: influence and coercion. Influence is the political power which causes a segment of the populace to shift allegiance from the opposing force to the unit projecting influence. Conversely, coercion is the political power that pushes a population segment favoring the friendly force into the

opposition camp" (McCurdy, 1988: 1-2). The need to represent coercion as a political power in the NEO environment is readily apparent. A segment of the population which may be on the fringe of supporting the force which threatens the security of U.S. noncombatants may be pushed over to the enemy side if they perceive a threat to their territory, particularly with the insertion of U.S. combat forces.

f. Confronter: Confronters contribute power to a force and are vulnerable to the power of an opposing force. In the NEO case, the friendly force has both military and political power since it can affect both the opposing military force and the civil populace. However, the RED force (i.e. enemy force) has only military power because the friendly force is only vulnerable to military power.

g. Relative Vulnerability: The relative vulnerability of a specific confronter or force, engaged in a given mission, to each category of power projected by the opposition. In the NEO environment, the BLUE or friendly force is vulnerable to the RED forces military power. On the other hand, the RED force is vulnerable to both the military and political power exerted by the BLUE force.

h. Network: The representation of an area of operations using critical locations (nodes) and the lines of communication (links) between these nodes. For the NEO

environment, the nodes are at each noncombatant location, evacuation site (i.e. airfield/port), and the specific location along each evacuation route where confrontation may be expected. The links are merely the road network between the noncombatant location to the particular evacuation site (i.e. airfield/port) (SOTACA User's Manual, 1987: 1-1 to 1-3).

The remainder of the terms which are specific to the operation and running of the SOTACA model can be found in the SOTACA User's Manual.

2. SOTACA Model Characteristics

a. SOTACA is a fast-running, interactive model used to assess the results of a confrontation between two opposing forces. SOTACA is capable of representing six to eight hours of conflict in about 30 seconds.

b. SOTACA is a network-based model as discussed earlier. The user defines his area of operations using nodes and links. SOTACA can provide a variety of link types and conditions which in turn allow the user to control the speeds at which forces can move between nodes.

c. The SOTACA user also defines the friendly and enemy forces used in the simulation. In the NEO environment, the friendly force is going to be a military police unit or some type of combat force, typically an infantry unit (e.g. Army, Marines). The enemy force could

be paramilitary forces as well as national military forces, local government, and local and national police. Additionally, propaganda units and the civil populace must also be considered. The type of enemy force to be portrayed in SOTACA will be the result of the latest intelligence estimates and threat situation which is the responsibility of USCENTCOM J2.

d. The SOTACA user also defines the unit's route through the network. In the NEO environment, this route is from each of the noncombatant locations to the evacuation site (i.e. airfield/port). In planning the NEO, planners want to avoid any conflict or confrontation along the route if at all possible. The reason is obvious; the purpose of the military force is to insure the security of the noncombatants and the best method of doing this is to avoid any confrontation if possible.

3. The Noncombatant Evacuation Operation (NEO) Scenario. For the purpose and scope of this thesis effort, the country of Sudan was chosen as the host country. The political situation has deteriorated in Sudan to the point where the Sudanese government can no longer insure the security of U.S. nationals in country, specifically Khartoum. Because of this situation, the U.S. Ambassador at Khartoum has exercised his right to request military support in the conduct of a NEO. One airfield has been

chosen as the evacuation site and must be secured. Further complicating the NEO is the fact that the U.S. noncombatants are located at three different locations throughout Khartoum. Security must be provided at each noncombatant location as well as along each route between the noncombatant location to the airfield evacuation site. Intelligence reports indicate that there may be some paramilitary forces threatening the security of U.S. nationals in Khartoum. Additionally, the civil populace in Khartoum is becoming more anti-American each day due to recent American actions in the Persian Gulf.

4. Measure of Effectiveness. A measure of effectiveness (MOE) used in the development of the NEO plan is to determine the minimum military force needed to insure the security of U.S. noncombatants from their respective noncombatant locations in Khartoum to the evacuation airfield site and subsequent evacuation to Cairo-West. The military force size and type must be kept to a minimum, not only from an airlift/sealift perspective, but a political perspective as well. A smaller, military police force would have less coercion power than a larger, combative infantry force. The political sensitivities of what type of force to employ in order to avoid an escalation of the particular threat environment is an important factor in the NEO planning process.

5. Mission Modes, Categories of Power, and Confronters.

a. Mission modes as defined in the SOTACA User's Guide are "a classification of battle intensities or methods of conflict (e.g. attack, defend, delay, hold). Each task force is assigned a primary mission mode that directs its level of aggression when confronted" (SOTACA User's Guide, 1987: 1-2). Based on any given situation, the BLUE or friendly force may have to attack, defend, or presume a mission mode of "control" referred to in the USPACOM study. The term "control" corresponds to controling the hearts and minds of the people (McGurdy, 1988: 6). Since the friendly forces are only vulnerable to military power, because of their makeup as well as the limited amount of time spent in the host country, the opposing enemy force does not have a "control" mission mode, only attack or defend.

b. As discussed earlier, categories of power represent both military and political power projected by friendly U.S. forces and only military power is projected by enemy forces. "Political power is further divided into influence and coercion which represent positive and negative political power, respectively" (McGurdy, 1988: 6). A more detailed definition of the types of power involved in this NEO environment was addressed earlier in the definition of terms portion of this appendix. Since

friendly U.S. forces are not vulnerable to any type of political power then the enemy forces are unable to project this type of power. However, U.S. forces are able to project both types of power because the enemy forces are vulnerable to both military and political power. It should be kept in mind that friendly coercion is really a positive factor for the enemy and not a negative one.

c. The confronters selected for the NEO application can be any size and type unit. For friendly forces, this is platoon size or greater and either military police or infantry. For enemy forces, confronters can be national military forces, paramilitary forces, local government, local and national police, and the civil populace. All confronter forces within the NEO environment project some degree of power except for the civil populace. The populace confronter is calibrated so that it projects no power, however, it is vulnerable to the political power projected by the friendly forces.

6. Model Calibration.

a. SOTACA model calibration consists of power, vulnerability, attrition, and forward-line-of-troops (FLOT) movement calibration. For the NEO environment, FLOT movement tracking is not necessary and therefore would not be calibrated (i.e. there is no FLOT).

b. Power calibrations for use in the NEO

environment may be based on Saaty's pairwise comparison technique, which is used to calculate the power and vulnerability values for all confronters in the scenario. USPACOM did not base their power calibrations on the pairwise comparison technique in its study, but rather professional and personal experience (McGurdy, 1988: 12). In this case, the BLUE military force projects military and political power. The RED military force projects only military power. The civil populace does not project either military or political power.

c. Vulnerability calibrations follow the same type of procedure as established in the power calibrations. The BLUE military force is only vulnerable to military power, whereas the RED military force is vulnerable to both military and political power.

d. Based on historical data (i.e. Dominican Republic, Grenada, etc.), attrition calibrations would have to be determined and input into SOTACA.

7. Unit Movements. The design of this application requires that each BLUE or U.S. military force unit be represented by two SOTACA forces, one representing its military and influence power and the other representing its coercive power. "To assure that all of a unit's power is accounted for in assessing confrontation outcomes, the blue and red forces have to be maneuvered simultaneously over

the same route" (McGurdy, 1988: 25).

8. Summary. The main purpose of SOTACA is to provide commanders and staff planners with an automated tool which they can use to rapidly analyze and assess alternative courses of action for small-scale operations. Taken in the context of the NEO situation and mission, the responsible commander wants to know:

a. What forces are available?

b. What is the best force mix that can be built keeping in mind that the force mix needs to be kept to the minimum to accomplish the mission?

c. What is the best organization and deployment/employment plan for that force mix?

(SOTACA User's Guide, 1987: 2-2)

SOTACA attempts to answer these questions and provide the commander or planner some type of feedback to continue the planning effort in the minimum amount of time.

The scope of this thesis effort focuses on the determination of the size and type of the military force needed to insure the security of U.S. noncombatants from Sudan. Given the ideal NEO environment which favors the use of a network based simulation system, SOTACA can be used as a method of verification for the NEO planners in determining the appropriate military force size and type.

Based on the USPACOM study, the material

presented in this appendix provides an approach and possible starting point for SOTACA application in a NEO scenario.

APPENDIX C HOOKBOOK

This appendix provides further suggestions and recommendations for enhancing the Noncombatant Evacuation Operation (NEO) Decision Support System (DSS) and the use of the adaptive design methodology. The hookbook items are a result of various thoughts and ideas which occured throughout the duration of this thesis effort. These hookbook items are broken down into two categories (i.e. DSS and Adaptive Design Enhancements) and arranged chronologically within category.

Decision Support System Enhancements

-15 Jul 1987 Eventually, an expert system should be developed which can provide the user some recommendations on what size and type of military force is needed for the security mission based on the threat, time, and distance factors. The decision rules for this expert system would have to be based on some type of historical data from previous NEO (e.g. Dominican Republic, Grenada). Such an expert system could drastically reduce the amount of time needed to determine the right size force mix in addition to reducing the uncertainty on the part of the user's subjective judgement.

-18 Aug 1987 Consideration should be given to the idea of triggering some type of window to open up on the screen display which would provide a map layout depicting the closest staging base for aircraft near the particular country of NEO interest, in this case Sudan. Of course, the staging base would have to be in a country which was favorable to supporting U.S. operations and provide limited basing rights. A considerable amount of planning time would be saved if this type of information was available and could be provided via the NEO DSS.

-14 Sep 1987 The NEO DSS needs to have access to some type of map data base which is maintained and updated. Recommend that the NEO DSS have access to the CIA Worldwide Map Data Base which is also currently integrated with

SOTACA. This requirement should not require a significant amount of time or effort, and should be easily implemented.

-6 Nov 1987 Initially, the focus of developing alternative courses of action was based on a worst-case scenario, that being a hostile NEO environment. Presently, the NEO DSS is designed to develop a course of action based on the present threat environment and the next higher level threat if applicable. For example, suppose the threat environment at noncombatant location 1 is semipermissive; a course of action would be planned for the semipermissive environment as well as the next higher level or nonpermissive environment. Recommend that some type of matrix system be developed which could be used to plan for all three types of environment: semipermissive, nonpermissive, and hostile.

-23 Nov 1987 There are special support personnel requirements needed for the conduct of a NEO. Some type of reminder for the NEO planner needs to be built into the NEO DSS which will remind him to think of such requirements as a medical team, military assistance team, combat control team, aviation detachment, etc. Special support personnel and equipment requirements would also need to be considered in the total airlift/sealift which is available.

-6 Jan 1988 The State Department's F77 report which provides a breakout of the noncombatants by type and numbers is sent via electrical message (i.e. gensor) from

the U.S. embassy in that country to each of the respective unified commands. Presently, this information is only disseminated every six months. There needs to be some type of communications link made available so that the embassies are able to update the NEO DSS directly and more often to avoid the uncertainty common to this type of perishable information.

-6 Jan 1988 Based on a meeting with the new USCENTCOM J5 NEO planner, a user desire was expressed which should be considered in any future enhancements to the NEO DSS. The ultimate goal of the NEO DSS should be to publish a final Operations Order (OPORD) along with the necessary support documents. It is recognized that such publication is going to be based strictly on the user's input and then only after the approval of the concept of operations by the Commander in Chief, USCENTCOM (USCINCCENT).

-6 Feb 1988 Recommend that there be some type of digitized map capability available which would be able to graphically illustrate the terrain along the various road routes for evacuation purposes. The map would have to be of sufficient scale to provide the user with a true appreciation for the terrain (e.g. 1:50,000). Additionally, this map data would be displayed on the screen via a window. Presently, only descriptions of key terrain are provided along each possible evacuation route.

-15 Feb 1988 The screen displays portrayed in the

storyboard in Appendix A are merely representative. Recommend that the screens for each display be at least twenty inches diagonal to allow for a better map display and to avoid the clutter which is common with the separate windows if they are activated.

-28 Feb 1988 Recognizing the need for SOTACA to be used in the role of assessing the alternative courses of action as well as verifying the military security force size and type, there needs to be close interface between J5, J3, and the Analysis Division at USCENTCOM. As the threat information is made known and input into the NEO DSS, there should be some type of interface capability which also automatically transfers this data into SOTACA. The network depicting the noncombatant locations, evacuation sites, and perspective evacuation routes should already have been predetermined and input. When J3 or J5 requires a course of action assessment, the SOTACA data base should be ready to execute. SOTACA must be able to provide a timely response or it will not be used.

<u>Adaptive Design Enhancements</u>

-6 Jan 1988 The problem of evaluation of the NEO DSS was discussed with the USCENTCOM users. Based on user comments, it was determined that the use of the hookbook to make recommendations for product improvement would not be too distractive to the user. Each hookbook displayed would

need to be tied with the respective screen display which prompted the user input. The hookbook provides a vehicle for the evaluation process which seems to be cumbersome at best.

-6 Jan 1988 Based on USCENTCOM user comments, it is absolutely critical to have windows come up on the basic screen display to maintain continuity of thought for the NEO planner. The planner needs to have access to as many windows as possible while still portraying the basic screen display.

-23 Feb 1988 There is a definite need to have more frequent meetings between the USCENTCOM user and the DSS/Data Base builder to insure construction of DSS is on track, meets user requirements, and can be modified if there are changes in those requirements. Recommend there be a minimum of once-a-month meetings between builder and user.

Bibliography

Alavi, Maryam and Albert H. Napier. "An Experiment in Applying the Adaptive Design Approach to DSS Development," Information and Management: 21-28 (July 1984).

Andriole, Stephen J. and others. "Storyboarding for C2 Systems Design: A Combat Support System Case Study," Draft Paper (reference LtCol John R. Valusek, Operational Sciences Department, Air Force Institute of Technology (AU), Wright-Patterson AFB OH) 1987.

Armed Forces Staff College. Joint Staff Officer's Guide 1986. AFSC Pub 1. Norfolk VA: National Defense University, 1 July 1986.

Burleson, Donald and others. "Design and Implementation of a Decision Support System for Academic Scheduling," Information and Management,: 57-64 (November 1986).

Freeman, Cdr Dale. Conversation. J-5 Plans, United States Central Command (USCENTCOM), MacDill AFB, FL, 30 June 1987.

Gowin, D. Bob and Joseph D. Novak. Learning How to Learn. New York NY: Cambridge University Press, 1984.

Hagwood, John. Formal "Systems Languages" in Decision Support Systems for Military Commanders. Contract DAJA 45-84-M-0275. Crook Hall, Sidegate Durham DH1 5SZ England, June 1986 (AD -A169 673).

Joint Chiefs of Staff. "SOTACA Handbook for Commanders and Staff Planners," Modern Aids to Planning Program, 14 March 1986.

Joint Chiefs of Staff. "SOTACA Analyst's Guide to Theory," Modern Aids to Planning Program, Preliminary Draft II, June 1986.

Joint Chiefs of Staff. "SOTACA User's Manual," Modern Aids to Planning Program, April 1987.

Keen, Peter G.W. "Adaptive Design For Decision Support Systems," ACM/Data Base, Volume 12, Number 1,2: 15-25 (Fall 1980).

Keen, Peter G.W. and Michael S. Scott-Morton. Decision Support Systems: An Organizational Perspective. Reading Massachusetts: Addison-Wesley Publishing Co., 1978.

Kopf, Cpt Thomas J. Design of an Aircrew Scheduling Decision Aid for the 6916th Electronic Security Squadron. MS Thesis 85-87. School of Engineering, Wright-Patterson AFB, OH, June 1987.

McCurdy, Michael L. A SOTACA-Based Methodology for Assessing the Impact of Mobility Enhancements on Civil-Military Operations, 6 January 1988.

McFarren, Capt Michael R. Using Concept Mapping to Define Problems and Identify Key Kernels During the Development of a Decision Support System. MS Thesis AFIT/GST/ENS/87M-12. School of Engineering, Air Force Institute of Technology (AU), Wright-Patterson AFB OH, June 1987.

Modern Aids to Planning (MAPP) Conference. Discussion of Logistics Support Models. J4, Joint Chiefs of Staff. Scott AFB, IL, October 1987.

Meador, Lawrence C. and William L. Rosenfeld. "Decision Support Planning and Analysis: The Problem of Getting Large DSS Started," MIS Quarterly,: 159-175 (June 1986).

Rouse, William B., and Sandra H. Rouse. A Framework for Research on Adaptive Decision Aids, 1 November 1982-31 October 1983. Contract F33615-82-C-0509. Wright-Patterson AFB, OH: Search Technology Inc., October 1983 (AD-A138331).

Seagle, John P. and Salvatore Belardo. "The Feature Chart: A Tool for Communicating the Analysis for a Decision Support System," North Holland Information and Management, 10: 11-19 (1986).

Sprague, Ralph H. Jr., and Eric D. Carlson. Building Effective Decision Support Systems. Englewood Cliffs NJ: Prentice-Hall Inc., 1982.

Sullivan, Cdr John F. "The Dominican Republic Crisis--The Background, The Initial Military Operation, and The Controversy." U.S. Army War College, Carlisle Barracks PA, 8 April 1966.

Valusek, LtCol John R. Class Notes taken in OPER 699, Decision Support Systems.School of Engineering, Air Force Institute of Technology (AU), Wright-Patterson AFB, OH, July-September 1987.

Watson, Hugh J. and Marianne M. Hill. "Decision Support Systems or What Didn't Happen with MIS," Interfaces,13: 81-88 (5 October 1983).

VITA

Captain Stephen R. Kostek was born on 11 August 1956 in Hadley, Massachusetts. He graduated from Hopkins Academy in 1974 and received a Bachelor of Sciences degree and his commission from the United States Military Academy in June 1978. In Nov 1978, he graduated from the Military Intelligence Officer Basic Course at Ft Huachuca, AZ. From Nov 1978 - Aug 1980, Captain Kostek served as a Company Commander and Battalion Operations Officer at the 6th Basic Training Battalion, Ft Jackson, SC. From Aug 1980 - Jul 1983, he served as Battalion Intelligence Officer for 2d Battalion, 59th Air Defense Artillery and then G2 Operations and Plans Officer for HQ, 1st Armored Division, Ansbach, FRG. From Jul 1983 - Jan 1984, Captain Kostek attended the Military Intelligence Officer Advance Course at Ft Huachuca, AZ. From Jan 1984 - Jul 1986, he served as an Intelligence Plans and Exercises Officer, Office of the Deputy Chief of Staff, Intelligence, U.S. Army Forces Command, Ft McPherson, GA. In Aug 1986, Captain Kostek entered the School of Engineering, Air Force Institute of Technology.

Permanent Address: 45 Lawrence Plain Road
Hadley, Massachusetts 01035

UNCLASSIFIED
SECURITY CLASSIFICATION OF THIS PAGE

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1a. REPORT SECURITY CLASSIFICATION: UNCLASSIFIED

1b. RESTRICTIVE MARKINGS

2a. SECURITY CLASSIFICATION AUTHORITY

2b. DECLASSIFICATION / DOWNGRADING SCHEDULE

3. DISTRIBUTION / AVAILABILITY OF REPORT: Approved for public release; distribution unlimited

4. PERFORMING ORGANIZATION REPORT NUMBER(S): AFIT/GST/ENS/88M-7

5. MONITORING ORGANIZATION REPORT NUMBER(S)

6a. NAME OF PERFORMING ORGANIZATION: School of Engineering

6b. OFFICE SYMBOL *(If applicable)*: AFIT/ENS

7a. NAME OF MONITORING ORGANIZATION

6c. ADDRESS *(City, State, and ZIP Code)*:
Air Force Institute of Technology
Wright-Patterson AFB OH 45433-6583

7b. ADDRESS *(City, State, and ZIP Code)*

8a. NAME OF FUNDING / SPONSORING ORGANIZATION

8b. OFFICE SYMBOL *(If applicable)*

9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER

8c. ADDRESS *(City, State, and ZIP Code)*

10. SOURCE OF FUNDING NUMBERS

PROGRAM ELEMENT NO	PROJECT NO	TASK NO	WORK UNIT ACCESSION NO

11. TITLE *(Include Security Classification)*: See Box 19

12. PERSONAL AUTHOR(S): Stephen R. Kostek, B.S., Capt, USA

13a. TYPE OF REPORT: MS Thesis

13b. TIME COVERED: FROM ________ TO ______

14. DATE OF REPORT *(Year, Month, Day)*: 1988 March

15. PAGE COUNT: 153

16. SUPPLEMENTARY NOTATION

17. COSATI CODES

FIELD	GROUP	SUB-GROUP
15	01	
15	02	

18. SUBJECT TERMS *(Continue on reverse if necessary and identify by block number)*: Noncombatant Evacuation Operations, Adaptive Design, Decision Support System

19. ABSTRACT *(Continue on reverse if necessary and identify by block number)*

Title: A USER'S DESIGN OF A DECISION SUPPORT SYSTEM FOR NONCOMBATANT EVACUATION OPERATIONS FOR UNITED STATES CENTRAL COMMAND

Thesis Chairman: John R. Valusek, Lt Col, USAF
Assistant Professor of Operations Research

20. DISTRIBUTION / AVAILABILITY OF ABSTRACT: ☒ UNCLASSIFIED/UNLIMITED ☐ SAME AS RPT ☐ DTIC USERS

21. ABSTRACT SECURITY CLASSIFICATION: UNCLASSIFIED

22a. NAME OF RESPONSIBLE INDIVIDUAL: John R. Valusek, Lt Col, USAF

22b. TELEPHONE *(Include Area Code)*: (513) 255-3362

22c. OFFICE SYMBOL: AFIT/ENS

DD Form 1473, JUN 86 — *Previous editions are obsolete.*

SECURITY CLASSIFICATION OF THIS PAGE
UNCLASSIFIED

Perhaps the most sensitive and most likely to occur crisis operation within any of the geographically oriented unified commands is the conduct of Noncombatant Evacuation Operations (NEO). NEO is a system which has been developed in order to evacuate all U.S. civilians and military dependents from a given area in the event of an emergency situation which poses a threat to their safety. The purpose of this research effort is to develop a conceptual design of a Decision Support System (DSS) which will support one of the unified commands, United States Central Command (USCENTCOM), in determining the appropriate military force size and type to be used to support the NEO. The most significant factors which impact on the NEO force size determination process are the time constraints involved and the need for intuitive (i.e. subjective) input versus objective input. This paper expands on the methodology used to capture the subjective judgements and planning factors taken into consideration by the USCENTCOM NEO planners and at the same time provide the DSS builder an objective framework on which to build a supporting system. This methodology, referred to as the adaptive design process, has been used to develop the concept DSS. Requiring a high level of user participation and involvement, the experimental adaptive design approach used in this research combines such techniques as concept mapping, storyboarding, and feature charts to determine DSS requirements and capture the decision process used by the NEO planners. Using these techniques, a problem space is defined and bounded. From this problem space, a key subproblem or "kernel" is identified which forms the basis of the DSS. This thesis discusses these techniques and illustrates how they were incorporated and expanded upon in the conceptual development of the specific NEO Decision Support System.

END
DATE
FILMED
4–88
DTIC